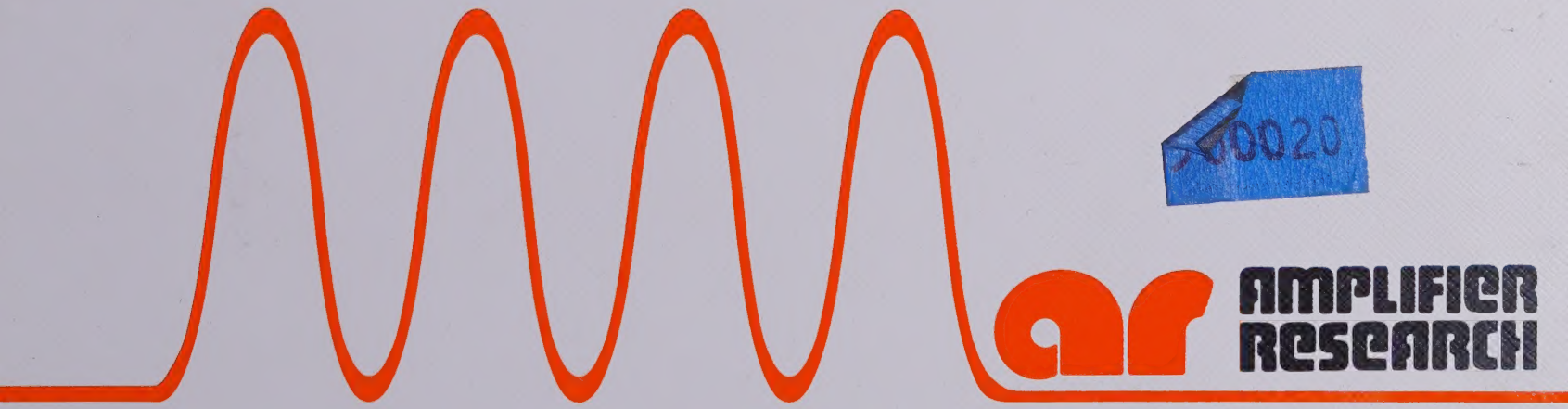

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Operating and Service Manual

MODEL

60S1G3M2

PART NUMBER

1011528-501

SERIAL NUMBER

300020

AMPLIFIER RESEARCH
Souderton, PA 18964-9990 USA
TEL 215-723-8181 TWX 510-661-6094 FAX 215-723-5688

Operating and Service Manual

AMPLIFIER RESEARCH

160 School House Road, Souderton, PA 18964-9990 USA
TEL 215-723-8181 • FAX 215-723-5688

EC Declaration of Conformity

We; Amplifier Research
160 School House Road
Souderton, Pa. 18964

declare that as of 1997, our product(s);

the Model 60S1G3 series amplifiers

to which this declaration relates is in compliance with the requirements of the EEC EMC Directive (89/336/EEC) and Low Voltage Directive (73/23/EEC) in accordance with the relative standards listed below:

EMC:

EN 50082-2 : 1995
Electromagnetic compatibility - Generic immunity standard
Part 2: Industrial environment

EN 55011 : 1991
Electromagnetic emissions requirements for Industrial, Scientific and Medical (ISM) Equipment
Group 1, Class A

Safety:

IEC 1010-1 : 1990 + A1, A2

The CE marking is affixed on the device according to the EC Directives.

Donald R. Shepherd
President

⚠ INSTRUCTIONS FOR SAFE OPERATION

BEFORE APPLYING POWER

Review this manual and become familiar with all safety markings and instructions.

Verify that the equipment line voltage selection is compatible with the main power source.

Protection provided by the equipment may be impaired if used in a manner not specified by Amplifier Research.

INTENDED PURPOSES

This equipment is intended for general laboratory use in a wide variety of industrial and scientific applications. It is designed to be used in the process of generating, controlling, and measuring high levels of electromagnetic Radio Frequency (RF) energy. Therefore, the output of the amplifier must be connected to an appropriate load, such as an antenna or field-generating device. It is the responsibility of the user to assure that the device is operated in a location which will control the radiated energy such that it will not cause injury and will not violate regulatory levels of electromagnetic interference.

HAZARDOUS RF VOLTAGES

The RF voltages on the center pin of the RF output connector can be hazardous. The RF output connector should be connected to a load before AC power is applied to the amplifier. Do not come into contact with the center pin of the RF output connector or accessories connected to it. Place the equipment in a non-operating condition before disconnecting or connecting the load to the RF output connector.

SAFETY GROUND

This equipment is provided with a protective earth terminal. The main power source to the equipment must supply an uninterrupted safety ground of sufficient size to the input wiring terminals, power cord, or supplied power cord set. The equipment **MUST NOT BE USED** if this protection is impaired.

PHYSICAL DAMAGE

The RF amplifier should not be operated if there is physical damage, missing hardware, or missing panels.

MAINTENANCE CAUTION

Adjustment, maintenance, or repair of the equipment must be performed only by qualified personnel. Hazardous energy may be present while protective covers are removed from the equipment, even if disconnected from the power source. Contact may result in personal injury. Replacement fuses are required to be of specific type and current rating.

⚠ INSTRUCTIONS FOR SAFE OPERATION *(continued)*

SAFETY SYMBOLS

This symbol is marked on the equipment when it is necessary for the user to refer to the manual for important safety information. This symbol is indicated in the "Table of Contents" to assist in locating pertinent information.

Dangerous voltages are present. Use extreme care.

CAUTION: The caution symbol denotes a potential hazard. Attention must be given to the statement to prevent damage, destruction, or harm.

Indicates protective earth terminal.

RANGE OF ENVIRONMENTAL CONDITIONS

This equipment is designed to be safe under the following environmental conditions:

Indoor use

Altitudes up to 2000M

Temperature of 5°C to 40°C

Maximum relative humidity 80% for temperatures up to 31°C. Decreasing linearity to 50% at 40°C.

Mains supply voltage fluctuations not to exceed ±10% of the nominal voltage or minimum and maximum autoranging values.

Pollution degree 2: Normally non-conductive with occasional condensation

While the equipment will not cause hazardous condition over this environmental range, performance may vary.

COOLING AIR

Care should be exercised not to block the cooling air inlets or outlets. Cooling air blockage can result in damage to the RF amplifier or intermittent shut-downs.

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SECTION I

GENERAL INFORMATION

1.1 GENERAL DESCRIPTION

The Model 60S1G3 is a self-contained, broadband microwave amplifier designed for laboratory applications where instantaneous bandwidth, high gain, and moderate power output are required. A "GAIN" control, located on the front panel, can be used to decrease the amplifier gain by 10 decibels (dB) or more. Solid state technology is used exclusively to offer significant advantages in reliability and cost. A Model 60S1G3, when used with a frequency-swept signal source, will provide 60 watts of swept power output from 0.8–3.0GHz. Typical applications include antenna and component testing, wattmeter calibration, and electromagnetic interference (EMI) susceptibility testing, as well as usage as a driver for frequency multipliers and high-power amplifiers. The Model 60S1G3 can be operated locally by using the front panel controls, or remotely by using either an IEEE-488 or RS-232 interface.

1.2 POWER SUPPLIES

The Model 60S1G3 contains switching power supplies. The input voltage range to the power supplies is 90–132 or 180–264 Volts Alternating Current (VAC), 50/60Hz, selected automatically. The operator does not have to switch or change anything on the Model 60S1G3 when changing the AC input voltage. AC power consumption is 600 watts nominal. A built-in circuit breaker provides primary AC circuit protection.

1.3 SPECIFICATIONS

Refer to the "Amplifier Research Data Sheet" on the following page for detailed specifications. All voltage measurements referenced in this manual are Direct Current (DC) unless stated otherwise.

AMPLIFIER RESEARCH
160 School House Road, Souderton, PA 18964-9990 USA
Phone 215-723-8181•FAX 215-723-5688

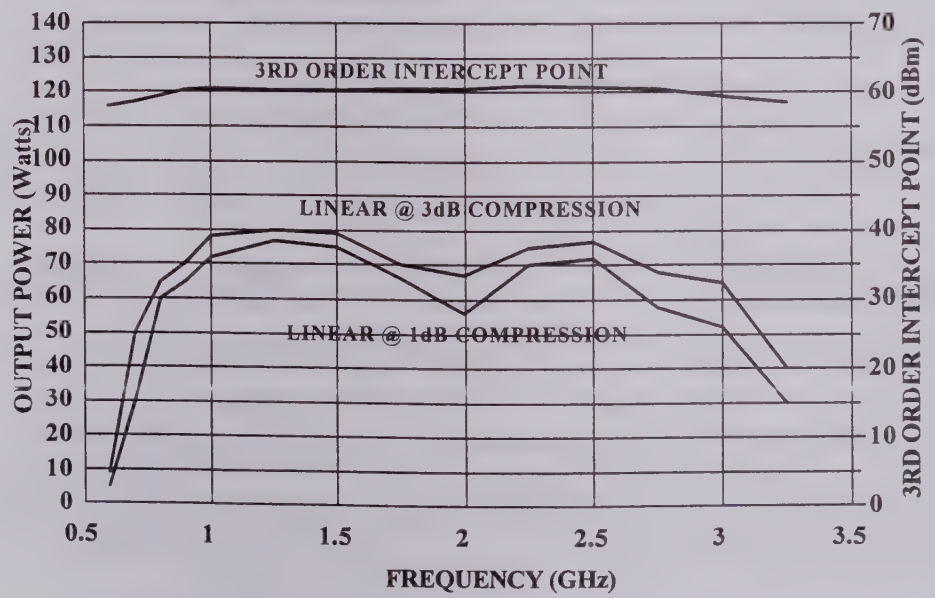
MODEL 60S1G3
M1, M2, M3, M4
60 WATTS CW
0.8 - 3.0 GHz

The Model 60S1G3 is a solid state, self-contained, air-cooled, broadband amplifier designed for applications where instantaneous bandwidth, high gain and linearity are required. Housed in a stylish contemporary cabinet, the unit is designed for benchtop use, but can be removed from the cabinet for immediate equipment rack mounting.

The 60S1G3, when used with a sweep generator, will provide a minimum of 60 watts of RF power. Included is a front panel gain control which permits the operator to conveniently set the desired output level. The 60S1G3 is protected from RF input overdrive by an RF input leveling circuit which controls the RF input level to the RF amplifier first stage when the RF input level is increased above 0 dBm. The RF amplifier stages are protected from over-temperature by removing the DC voltage to them if an over-temperature condition occurs due to cooling blockage or fan failure. There is a digital display on the front panel to indicate the operate status and fault conditions if an over-temperature or power supply fault has occurred. The unit can be returned to operate when the condition has been cleared. The 60S1G3 digital panel provides control of all amplifier functions both locally and remotely via IEEE-488 (GPIB) or RS-232 interfaces.

The low level of spurious signals and linearity of the Model 60S1G3 make it ideal for use as a driver amplifier in testing wireless and communication components and subsystems. It can be used as a test instrument covering multiple frequency bands and is suitable for a variety of communication technologies such as CDMA, W-CDMA, TDMA, GSM etc. It is also suitable for EMC Test applications where undistorted modulation envelopes are desired.

60S1G3
Typical Performance



REV060800

Model 60S1G3

RATED POWER OUTPUT ..... *60 watts minimum*

INPUT FOR RATED OUTPUT ..... *1.0 milliwatt maximum*

POWER OUTPUT @ 3dB COMPRESSSION
Nominal ..... *70 watts*
Minimum ..... *60 watts*

POWER OUTPUT @ 1dB COMPRESSION
Nominal ..... *60 watts*
Minimum ..... *50 watts*

FLATNESS ..... *±1.5 dB typical*
..... *±2.0 dB maximum*

FREQUENCY RESPONSE ..... *0.8 - 3.0 GHz*
..... *instantaneously*

GAIN (at maximum setting) ..... *48 dB minimum*

GAIN ADJUSTMENT .....*(Continuous Range)*
.....*10 dB minimum*
..... *(4096 steps remote)*

INPUT IMPEDANCE ..... *50 ohms*
.....*VSWR 2.0:1 maximum*

OUTPUT IMPEDANCE ..... *50 ohms, nominal*

MISMATCH TOLERANCE

100% of rated power without foldback. Will operate without damage or oscillation with any magnitude and phase of source and load impedance. (See Application Note #27)

MODULATION CAPABILITY

Will faithfully reproduce AM, FM, or pulse Modulation appearing on the input signal

THIRD ORDER INTERCEPT

See chart. The third order intercept points for this chart have been determined using two tones spaced 1 MHz apart. This is typical for W-CDMA systems. Closer tone spacing such as 60 kHz generally provides about a 1db to 3db improvement in the IP.

HARMONIC DISTORTION .....*Minus 20 dbc*
.....*max at 50 watts*

SPURIOUS .....*Minus 73 dbc Typ.*

PHASE LINEARITY ..... *± 1.0 deg/100 MHz, Typ*

PRIMARY POWER..... *(Selected Automatically)*
..... *90-132, 180-264 VAC*
.....*50/60 Hz, single phase*
.....*600 watts maximum*

CONNECTORS
RF..... *Type N female*
REMOTE INTERFACES
IEEE-488 .....*24 pin*
RS-232 .....*9 pin Subminiature D*

SAFETY INTERLOCK..... *15 pin Subminiature D*

COOLING ..... *Forced air (self contained fans)*

MODEL CONFIGURATIONS

MODEL NUMBER	RF INPUT	RF OUTPUT	WEIGHT	SIZE(WxHxD
60S1G3	Type N female on front panel	Type N female on front panel	45 kg (100 lbs)	50.3 x 24.9 x 54.6 cm 19.8 x 9.8 x 21.5 in
60S1G3M1	Type N female on rear panel	Type N female on rear panel	45 kg (100 lbs)	50.3 x 24.9 x 54.6 cm 19.8 x 9.8 x 21.5 in
60S1G3M2	Same as 60S1G3 with enclosure removed for rack mounting		32 kg (71 lbs)	48.3 x 22.2 x 54.6 cm 19.0 x 8.75 x 21.5 in
60S1G3M3	Same as 60S1G3M1 with enclosure removed for rack mounting		32 kg (71 lbs)	48.3 x 22.2 x 54.6 cm 19.0 x 8.75 x 21.5 in
60S1G3M4	Same as 60S1G3M2 except the gain control knob is removed and a lock is installed		32 kg (71 lbs)	48.3 x 22.2 x 54.6 cm 19.0 x 8.75 x 21.5 in

SECTION II

OPERATING INSTRUCTIONS

2.1 GENERAL

Operation of the Model 60S1G3 broadband microwave amplifier is simple. The input signal, whether swept or fixed in frequency, is fed into the jack marked **"INPUT"** and the amplifier output signal is taken from the jack labeled **"OUTPUT."** The unit is turned "ON" by activating the power switch. A circuit breaker in the AC line provides protection in the event of a unit malfunction. A polarized, three (3)-wire AC power cord is also included with the unit to provide cabinet and chassis grounding to the power mains.

⚠ CAUTION:

OPERATION OF THE MODEL 60S1G3 AMPLIFIER IS NOT CRITICALLY AFFECTED BY SOURCE AND LOAD VOLTAGE STANDING-WAVE RATIO (VSWR), AND THE UNIT WILL REMAIN UNCONDITIONALLY STABLE UNDER ANY MAGNITUDE AND PHASE CONDITIONS OF SOURCE AND LOAD. THE MODEL 60S1G3 HAS ALSO BEEN DESIGNED TO WITHSTAND RF INPUT POWER LEVELS AS HIGH AS 20MW—TWENTY (20) TIMES ITS RATED INPUT POWER LEVEL OF 1MW—WITHOUT SUSTAINING DAMAGE. HOWEVER, RF INPUT POWER LEVELS GREATER THAN 20MW OR TRANSIENTS WITH HIGH PEAK VOLTAGES CAN DAMAGE THE AMPLIFIER. ALSO, ACCIDENTAL CONNECTION OF THE MODEL 60S1G3's OUTPUT TO ITS INPUT CAN CAUSE OSCILLATIONS THAT WILL PERMANENTLY DAMAGE THE UNIT'S INPUT CIRCUITRY.

IMPORTANT NOTE:

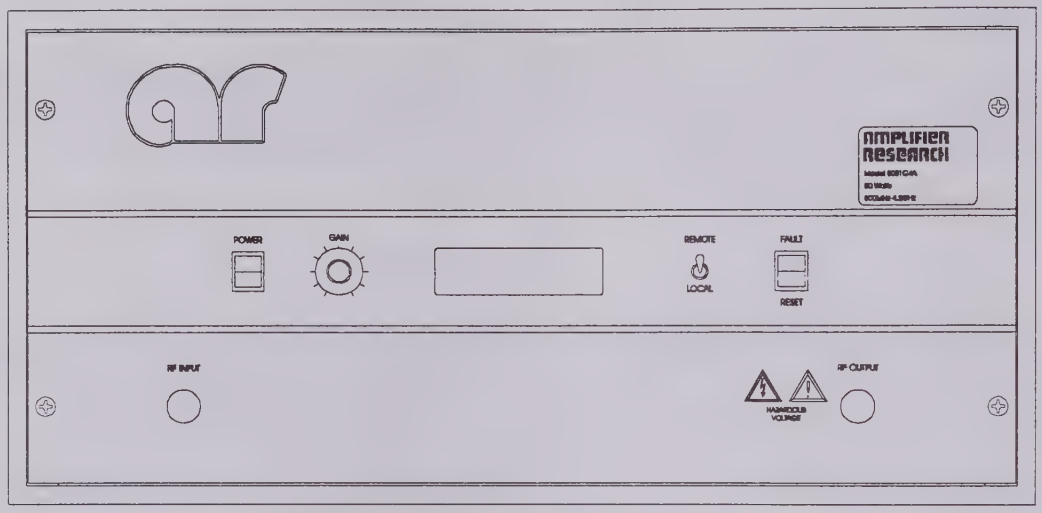
ALTHOUGH THE MODEL 60S1G3 IS DESIGNED TO OPERATE WITHIN THE OVERDRIVE AND LOAD TOLERANCE CONDITIONS DESCRIBED ABOVE, SUBJECTING THE AMPLIFIER TO THESE CONDITIONS SIMULTANEOUSLY CAN CAUSE FAILURE OF THE UNIT'S OUTPUT TRANSISTORS. REPEATED FAILURES OF THIS NATURE WILL NOT BE COVERED UNDER THE UNIT'S WARRANTY.

The Model 60S1G3 Amplifier is protected from input overdrive by an Automatic Level Control (ALC) Circuit that limits the maximum RF level to the first gain stage (Q1) of the RF Amplifier to approximately 0dBm.

The Model 60S1G3's RF power transistors are protected from over-temperature by a sensor that senses the heat sink temperature near the RF output transistors. In the event of a cooling fan failure or an air flow blockage, the DC voltage will be removed from the RF stages; if and when the heat sink temperature reaches approximately 70°C. The (VFD) vacuum flourescent display on the unit's front panel will indicate "Thermal Fault". Normal operation can be resumed by resetting the amplifier after the heat sink temperature drops below 70°C.

2.2 AMPLIFIER OPERATION

Figure 2-1 shows the front panel of the Model 60S1G3 Broadband Microwave Amplifier.



2.2.1 Local Operation

Power-up Sequence:

1. Connect input signal to **"INPUT"** connector. **The input signal level should be 0dBm maximum.**
2. Connect load to **"OUTPUT"** connector.
3. Set the **"LOCAL/REMOTE"** switch to **"LOCAL."**
4. Check to see that the MAIN POWER switch (circuit breaker) on the unit's rear panel is set to the 1 ("on") position.
5. Press the **"POWER"** switch: the front panel vacuum fluorescent display (VFD) should read POWER ON, STATUS PK when power is applied.

   (NOTE: The Amplifier changes state each time the "POWER" switch is depressed—if the unit is on when the POWER switch is depressed, it will turn off; if the unit is off when the POWER switch is depressed, it will turn on.)
6. Adjust the gain by rotating the **"GAIN"** knob.
7. In the event of a Fault, press the **"RESET"** switch. If the problem persists, refer to Section 4.3 ("Troubleshooting") of this manual.

2.2.2 Remote Operation

2.2.1.1 Introduction

This subsection describes remote operation of the Model 60S1G3 amplifier by utilizing either the IEEE-488 parallel interface or the RS-232 serial interface and a controlling device, such as a bus controller or a personal computer (PC).

2.2.2.2 Selecting Remote Operation

The Model 60S1G3 can be placed in remote state at any time by switching the "**REMOTE/LOCAL**" switch on the front panel to the "**REMOTE**" position. In this mode, control is transferred to the selected remote interface and all the front panel controls are inoperative with the exception of the **REMOTE/LOCAL** switch. The amplifier's initial state will be **Power Off**, Minimum Gain. The front panel VFD will indicate **REMOTE** until the unit is returned to the local operation mode.

2.2.2.3 Interface Selection

The Model 60S1G3 can be controlled via either the IEEE-488 or RS-232 interfaces. Which interface is active is determined by the position of Switch 6 of the rear panel dual-in-line package (DIP) switch located between the two interface connectors. If Switch 6 is in the "on" (1) position, the active interface will be the RS-232. The "off" (0) position will activate the IEEE-488 interface.

2.2.2.4 Interface Set-up

Switches 1–5 of the rear panel DIP switch are used to select either the RS-232 communication (BAUD) rate or the IEEE-488 device address, depending upon which interface is active. (**NOTE:** These switches are only read at device power-up. In order for changes made in these switch settings to take place, AC power must be removed and then re-applied to the Model 60S1G3.)

2.2.2.4.1 RS-232 BAUD rate selection

The serial communication (BAUD) rate can be set to five different levels. Selections are made by the positions of Switches 1–5 of the rear panel DIP switch. The following is a list of the available BAUD rates and the corresponding switch positions:

BAUD Rate	Switch on (1)
1200	1 only
2400	2 only
9600	3 only
19600	4 only
76800	5 only

(NOTE: Any other combination of switch settings will result in a BAUD rate equal to 1200.)

2.2.2.4.2 IEEE-488 device address selection

The IEEE-488 device address can be set to any number between 1 and 30. This selection is made by setting Switches 1–5 of the rear panel DIP switch to the binary equivalent of the number. **Table 2-1** illustrates this switch selection.

Table 2-1: IEEE-488 Device Address Selection

Device Address	Switch 5	Switch 4	Switch 3	Switch 2	Switch 1
1	off (0)	off (0)	off (0)	off (0)	on (1)
2	off (0)	off (0)	off (0)	on (1)	off (0)
3	off (0)	off (0)	off (0)	on (1)	on (1)
4	off (0)	off (0)	on (1)	off (0)	off (0)
5	off (0)	off (0)	on (1)	off (0)	on (1)
:					
:					
30	on (1)	on (1)	on (1)	on (1)	off (0)

2.2.2.5 Command Set Format

Each command is composed of one alpha character, up to four numeric parameters, and a command termination character. The command termination character is the "line feed" command, which is denoted and entered as <LF>. Commands are case-sensitive and must be entered in upper case only in order to be recognized.

2.2.2.6 IEEE-488 Communications

For IEEE-488 communications, the "End or Identify" (EOI) control line may also be used for command termination. When sending commands to the Model 60S1G3 via the IEEE-488 bus, terminate each command with a <LF>, an EOI, or both. No characters are permitted after the <LF> or EOI; the 60S1G3 interprets characters following the <LF> or EOI as the start of the next command. When an error condition is present at the Model 60S1G3, the "Service Request" (SRQ) line is asserted. The operator can then perform a serial poll operation. The Model 60S1G3 error code (in binary) is contained in the returned serial poll status byte (STB). These error codes are defined in **Table 2-2.**

TABLE 2-2: REMOTE ERROR CODES/MESSAGES

IEEE-488 SERIAL POLL RESPONSE (STB) (binary)/decimal	MODEL 60S1G3 ERROR CONDITION	RS-232 ERROR MESSAGE
(01000001) 65	BAD COMMAND	E1
(01000010) 66	BAD PARAMETER	E2
(01000011) 67	INTERLOCK FAULT	E3
(01000100) 68	THERMAL FAULT	E4
(01000101) 69	POSITIVE 15 VOLT FAULT	E5
(01000110) 70	POSITIVE 16.5 VOLT FAULT	E6
(01000111) 71	NEGATIVE 5 VOLT FAULT	E7
(01001000) 72	NEGATIVE 15 VOLT FAULT	E8
(01001001) 73	AMP FAULT	E9
**********	TRANSMISSION	E10

2.2.2.7 RS-232 Communications

If RS-232 is the active interface, the Model 60S1G3 will test for a properly connected RS-232 interface when switched into remote mode. In order for the Model 60S1G3 to recognize an RS-232 connection, the "Data Carrier Detect" (DCD) line must be asserted. This line is sampled continuously to determine if the RS-232 connection is broken; therefore, it must remain asserted in order for the RS-232 interface to function. The "Clear To Send" (CTS) line is also used to gate information from the Model 60S1G3. This line must be asserted in order to receive information from the Model 60S1G3. The CTS line can be used as a "handshake" line to inform the Model 60S1G3 when it is permissible to send information. If the CTS line is de-asserted in the middle of a transmission, the character in the process of being transmitted will be completed and further transmission will halt until the CTS line is re-asserted. The Model 60S1G3 itself asserts two lines—"Data Terminal Ready" (DTR) and "Request To Send" (RTS). The DTR line is continuously asserted, while the RTS line is used to gate information into the Model 60S1G3. Connector pin-out information is given in **Table 2-3**.

TABLE 2-3: RS-232 CONNECTOR PIN-OUTS

Pin No.	Signal	Data Direction*	Description
1	DCD	<	Device Carrier Detect
2	RD	<	Receive Data
3	TD	>	Transmit Data
4	DTR	>	Data Terminal Ready
5	GND	N/A	Ground
6	NC	N/A	No Connection
7	RTS	>	Ready To Send
8	CTS	<	Clear To Send
9	NC	N/A	No Connection

*Note:
> Output from Model 60S1G3
< Input to Model 60S1G3

Special Note: A null modem cable or adapter is required in order to properly interface the Model 60S1G3 to a standard serial port on a computer.

Once the RS-232 interface is established, commands are processed in the same manner as that of the IEEE-488 interface. The command structure is identical except that there is no EOI line. Therefore, all commands are terminated with a line feed (<LF>). Since this is a full-duplex asynchronous interface, if the Model 60S1G3 detects an error, the error message is immediately transmitted to the host controller. These error messages are defined in **Table 2-2.**

2.2.2.7.1 RS-232 port settings

The RS-232 port settings used for communication with the Model 60S1G3 are as follows.

Word Length:	8 bits
Stop Bits:	1
Baud Rate:	1200–76,800 (switch-selectable)
Parity:	None

2.2.2.8 Remote Commands

The following commands are available to the user for remote communication and operation of the Model 60S1G3. In the descriptions of these commands, a lower-case "x" is used to signify a numeric value or parameter.

2.2.2.8.1 POWER ON/OFF

Controls the power on/off state of the Model 60S1G3.

Syntax: Px

Parameters: 0 = power off

1 = power on

Example: To turn the power on, send the following command:

P1<LF>

2.2.2.8.2 GAIN

Sets the remote gain level of the Model 60S1G3 with 4095 steps of resolution.

Syntax: Gxxxx

Parameters: 0000 = maximum gain

:

:

4095 = minimum gain

Example: To set the Model 60S1G3 to minimum gain, send the following command:

G4095<LF>

2.2.2.8.3 RESET

Resets the Model 60S1G3, clearing all Faults, if possible.

Syntax: R

Parameters: None

Example: To clear a Fault, send the following command:

R<LF>

SECTION III

THEORY OF OPERATION

3.1 INTRODUCTION

The Model 60S1G3 Microwave Amplifier consists of a 0.8–3.0 gigahertz (GHz) RF Amplifier located on the heat sinks and a Power Supply/Operate/Fault Circuit mounted on a chassis assembly located opposite the output heat sink. The RF Amplifier assemblies can be accessed through the top or bottom of the unit, and the Power Supply and Operate/Fault Circuits can be accessed through the bottom of the unit.

The RF Amplifier assembly consists of a Variable Gain Amplifier, a Splitter/Detector, a Linearizer/Control Circuit, a One (1)-watt Amplifier, a Bias Control Circuit, a driver stage, a Two-Way Splitter, two more driver stages, two Four-Way Splitters, eight output stages, and an Eight-Way Combiner.

The Power Supply section consists of an AC input filter, a circuit breaker, two switching power supplies, an Operate/Control Circuit, and a Regulator/Fault Circuit.

3.2 RF AMPLIFIER OPERATION

3.2.1 A1 Variable Gain Amplifier (Schematic No. 1008812—Part of Schematic No. 1008816)

The RF input signal is fed to the A1 Variable Gain Amplifier, RF Attenuator U1. U1 is a Gallium Arsenide (GaAs) Field-Effect Transistor (FET) Attenuator. DC signals between approximately -0.5V to -2.0V are used to control the shunt and series legs of the RF Attenuator. This Attenuator is used for manual gain control using the front panel "GAIN" control or for remote gain control, and to attenuate RF input signals above 0dBm, by utilizing internal voltages.

Inductor–Capacitor (LC) networks C2, L1, C3, and L2 form high-pass filters that are used to attenuate low-frequency signals.

Transistor Q1 is a GaAs FET and is the first stage of gain in the amplifier. Transistor A3Q1 in the A3 Linearizer Control Circuit controls the drain current through FET Q1. The output of Q1 is fed to the input of the Wilkinson Two-Way Splitter.

The Wilkinson Two-Way Splitter splits the signal into two paths. One output is fed to the input of the A4 One (1)-Watt Amplifier. The other output is fed to a detector that is terminated in 50Ω. The detected output is fed to the A3 Linearizer Control Circuit.

3.2.2 A3 Linearizer Control Circuit (Schematic No. 1007392—Part of Schematic No. 1008816)

Integrated circuit (IC) U1A provides a DC signal to the series element of the A1U1 Attenuator. The A1U1 has minimum attenuation when the control signal is at approximately -12.5V with maximum attenuation (minimum gain) occurring with 0V on the control input.

3.2.2 A3 Linearizer Control Circuit *(continued)*

NPN transistors Q2, Q3, and Q4 are used to provide break points in the series control voltage to the A1U1 RF Attenuator, thereby providing a more linear gain control/attenuation characteristic. IC U1B maintains the output impedance of the A1U1 RF attenuation near 50Ω. U1B is a comparator; a reference voltage is developed across a 56Ω resistor (R22) connected to the non-inverting input. The inverting input is connected to the output of the RF Attenuator A1U1 through A1L2. If the DC voltage at the output of the RF Attenuator becomes more negative, the output from the comparator will become more positive, thereby decreasing the output impedance of the A1U1 Attenuator and maintaining the correct output impedance.

PNP transistor Q1 is used to control the drain current of GaAs FET A1Q1 by varying the A1Q1 gate voltage. A reference voltage is provided at the base of Q1 by voltage dividers R25 and R26. The drain current of the RF FET (A1Q1) flows through R27 (220Ω, 1 watt). PNP transistor Q1 varies the gate voltage to the RF FET A1Q1 to maintain the correct drain current.

IC U2A amplifies the signal from the A1CR1 detector diode. IC U2B is a comparator; its normal output is approximately -12.5V. When the RF input signal to the A1 Variable Gain Amplifier is increased above approximately 1mW (0dBm), the voltage output from U2B will become less negative. This voltage is fed to the "GAIN" control on the front panel of the amplifier. The wiper of the "GAIN" control is connected to the control input of U1A of the Linearizer/Control Circuit. The amplifier has maximum gain at approximately -12.5V control input; minimum gain occurs at 0V. The attenuation of A1U1 will increase as the output of A3U2B varies from -12.5V toward 0V. This will help to protect the unit in the event of input overdrive.

3.2.3 A4 One (1)-watt Amplifier (Schematic No. 1010591—Part of Schematic No. 1010749)

The A4 One (1)-watt Amplifier is assembled on a Teflon®/glass printed wiring board (PWB). It has three (3) GaAs FET gain stages. Each stage is input and output DC isolated by coupling capacitors. Resistive feedback is used from the drain to the gate of the GaAs FET to decrease the low-frequency gain. Shunt capacitive stubs are used to tune the amplifier. The drain of Q3 is matched to the output using a tapered transformer.

The GaAs FETs are operated in a depletion mode. They will conduct the maximum DC current with 0V bias on their gates and are normally operated with approximately -1V to -4V on their gates.

3.2.4 A5 Bias Control Circuit (Schematic No. 1010902—Part of Schematic No. 1010749)

The Bias Control Circuit controls the DC drain current of the three (3) FET stages in the A4 One (1)-watt Amplifier by varying the gate voltage of the RF stages. The Bias Control Circuit has a -5V input and a +16.5V input from the power supply.

All of the Bias Control Circuit stages operate in a similar manner; therefore, only the operation of the Q4 stage is described herein.

PNP transistor Q4 (2N3906) is used to control the DC current through the A4Q3 FET in the A4 One (1)-watt Amplifier. A reference voltage of 9.5V is established on the base of Q4 with the voltage divider network R7 (2.2K) and R12 (3.0K). There is a 18Ω resistor from the 16.5V line to the emitter of Q4 and also to the drain of A4Q3 in the A4 One (1)-watt Amplifier. Q4 will operate normally with approximately 10.2V on the emitter; this will occur with approximately 370mA through the 18Ω resistor R8. If the current through A4Q3 decreases, the drop across R8 will decrease, thereby increasing the emitter voltage of Q4; this will cause Q4 to conduct more, which will cause the gate voltage of A4Q3 to become more positive, which will cause A4Q4 to conduct more, thereby returning the voltage at the emitter of Q4 to 10.2V.

3.2.5 A6, A8, A9, A12, A13, A14, A15, A16, A17, A18, and A19 Quadrature-Coupled Amplifiers ("Quad Amps") (Schematic No. 1009163)

IC U1 is a voltage regulator set to 13.5V output with a current limit of approximately 2.2 amps. Q1 turns off the voltage regulator when the -5V supply voltage falls below approximately -3.5V. PNP transistors Q2 and Q5 regulate the DC current through Q3 and Q4, respectively, by sensing the voltage drop across 2.7Ω resistors R5 and R16 and varying the negative voltage on the gates of Q3 and Q4, thereby maintaining the drain current at approximately 1 amp. The DC operation of Q3 and Q4 can be checked on test points TP1 and TP2 without removing the unit's lid. The normal voltage on TP1 and TP2 without RF drive is 10.9 ±0.4V.

U2 and U3 are 90° quadrature couplers. U2 splits the input signal into two signals with a phase difference of 90°. U3 combines the RF outputs from Q3 and Q4 and is connected to the output connector J2. 50Ω termination resistors R17 and R18 absorb any difference signals and help to improve the input and output VSWR of the module. The module has a gain of 7.5dB or greater and delivers approximately 8 watts of RF power.

3.2.6 A7 Two-Way Splitter

A7 is a multi-section, broadband Wilkinson splitter. The input signal is split into two equal amplitude, in-phase signals. The amplitude of each signal is 3–3.5dB below the input signal when terminated in 50Ω loads.

3.2.7 A10, A11 Splitters

A10 and A11 are multi-section, multi-stage, broadband Wilkinson splitters. Each input signal is split into four equal amplitude, in-phase signals. The amplitude of each output signal should be 6–7dB below the input signal when they are terminated in 50Ω.

3.2.8 A20 Combiner

A20 is an Eight-Way Radial Combiner with impedance matching. The outputs of the A12, A13, A14, A15, A16, A17, A18, and A19 amplifiers are combined in A20 to yield a total power output approximately 9dB above the output of a single amplifier. The output of A20 is connected to the output connector of the Model 60S1G3.

3.3 POWER SUPPLY ASSEMBLY (Schematic No. 1010552)

The Power Supply Assembly consists of three switching power supplies—PS1, PS2, and PS3. These power supplies have a regulated output and auto-ranging on the input to automatically select the correct connections for the line voltage in use, either 90–132 or 180–264VAC, 50/60Hz.

PS1 is a triple-output power supply that provides +5V, +12V and –12V to power the Operate/Control Board. PS2 is also a triple-output power supply that provides +16.5V to the EFT drain supplies in the One (1)-Watt, Four (4)-Watt and Quadrature-Coupled amplifiers. PS2 also provides +24V and –24V. The +24V power supply powers the cooling fans; it is also regulated to +15V to operate the A3 Linearizer Control Board; it is also regulated to –5V to provide bias for the GaAs FETs in the One (1)-Watt, Four (4)-Watt and Quadrature-Coupled amplifiers. Relay K1 switches the AC input power to PS2 for local and remote amplifier operation. Fans B1, B2 and B3 supply air flow to cool the heat sink and the power supplies.

3.3.1 A21 Operate/Control Board (Schematic No. 1008597)

The A21 Operate/Control Board is a microcontroller-based printed wiring board (PWB) assembly that allows sensing and control of internal signals as well as remote personal computer (PC) control via on-board RS-232 and IEEE-488 data communications ports. The Operate/Control Board utilizes a state-of-the-art, Reduced Instruction Set Computing (RISC) microcontroller that can quickly and reliably perform all front panel control and monitoring tasks, thereby allowing real-time control of the Model 60S1G3 via either remote bus. Besides being reported remotely, all amplifier Faults are continuously monitored and indicated via the front panel VFD.

3.3.2 A22 Regulator/Control Board (Schematic No. 1009511)

The A15 Regulator/Control Board is comprised of DC regulators, comparators, and relays.

3.3.2.1 Relays K1, K2 and K3 are energized by the A14 Operate Control Board whenever the Model 60S1G3 is turned on, either locally or remotely. When energized, these relays supply DC power to ICs U1, U3 and U6 and Relay K1 in the Power Supply Assembly.

3.3.2.2 IC U1 supplies +15V to the A3 Linearizer Control Circuit. IC U6 supplies –15V to the A3 Linearizer Control Circuit. IC U3 supplies –5V to all of the Quad Amps, the A4 One (1)-Watt Amplifier, and the A6 Four (4)-Watt Amplifier.

SECTION IV

MAINTENANCE

4.1 GENERAL MAINTENANCE INFORMATION

The Model 60S1G3 is a relatively simple instrument that should require very little maintenance. It is built with printed wiring boards (PWBs) and solid state components in order to ensure long, trouble-free life. However, should a malfunction occur, special care must be taken when servicing the unit in order to avoid damage to the solid state components or the PWBs.

Since the unit's solid state components are soldered in place, substitution of components should not be resorted to unless there is some indication that they are faulty. In addition, when troubleshooting, care must be taken to avoid shorting amplifier voltages. Small bias changes may cause excessive dissipation or transients that could ruin the amplifier.

All components utilized in Amplifier Research instruments are conservatively operated to ensure maximum instrument reliability. Despite this, parts within an instrument may fail. In most cases, the instrument may be repaired immediately with a minimum of "down time." A systematic approach to troubleshooting can greatly simplify and thereby speed up the required repairs.

However, due to the critical importance of maintaining the amplifier's alignment, it is recommended that the unit be returned to the factory for part replacement and amplifier realignment when failure is caused by a breakdown of any of the components in the RF signal circuits. Shipping instructions are as follows.

Please ship the unit PREPAID via United Parcel Service (UPS) to:

Amplifier Research Corporation
160 School House Road
Souderton, PA 18964-9990

4.2 DISASSEMBLY PROCEDURE

⚠ CAUTION:

EXTREME CAUTION SHOULD BE EXERCISED WHEN TROUBLESHOOTING THIS UNIT, PARTICULARLY WHEN MEASURING VOLTAGES IN THE POWER SUPPLY SECTION, SINCE HAZARDOUS VOLTAGES EXIST IN THE UNIT THAT COULD CAUSE SERIOUS INJURY TO ANY PERSONNEL PERFORMING THE MEASUREMENTS.

The amplifier can be removed from its housing by removing four (4) screws from the front panel and four (4) screws from the back panel. The amplifier can then be slid from its housing. The top cover can be removed to gain access to the RF assemblies; the bottom cover can be removed to gain access to the power supplies.

4.3 Troubleshooting

⚠ CAUTION:

THE MICROWAVE TRANSISTORS USED IN THE MODEL 60S1G3 AMPLIFIER ARE GAAS FETS. THESE DEVICES ARE VERY RELIABLE WHEN INSTALLED IN A SUITABLE CIRCUIT, BUT THEY CAN BE EASILY DAMAGED BY IMPROPER TROUBLESHOOTING OR HANDLING TECHNIQUES. THE GATE JUNCTIONS OF THE GAAS FETS HAVE A HIGH INPUT IMPEDANCE AND ARE SUSCEPTIBLE TO STATIC DAMAGE OR DAMAGE DUE TO THE USE OF AN UNGROUNDED SOLDERING IRON. DO NOT TRY TO CHECK THE GAAS FETS WITH AN OHMMETER. USE CAUTION WHEN TROUBLESHOOTING THE GAAS FETS; DO NOT SHORT THE GATE TO THE GROUND OR TO THE DRAIN.

⚠ CAUTION:

USE CARE WHEN UNPACKING NEW GAAS FETS. THE GAAS FET PACKAGING SHOULD ONLY BE OPENED AT ELECTROSTATIC DISCHARGE (ESD)-APPROVED WORKSTATIONS, BY INDIVIDUALS WHO ARE FAMILIAR WITH THE HANDLING OF MICROWAVE GAAS FETS AND OTHER ESD-SENSITIVE DEVICES.

Troubleshooting the Model 60S1G3 in a logical manner can speed the solution to a problem. The settings of potentiometers ("pots"), capacitors ("caps"), or other variables should not be disturbed until other problems have been eliminated. Comparing the measured DC voltages to those shown on the schematics can solve many problems. Before measuring circuit voltages, first verify that the voltages to the circuits are correct.

Model 60S1G3 Troubleshooting Categories:

Subsection 4.3.1—**"Power On"** Indication Doesn't Display on Front Panel when **POWER** Switch is Depressed

Subsection 4.3.2—The Unit Cannot be Operated Remotely

Subsection 4.3.3—Thermal Fault

Subsection 4.3.4—Interlock Fault

Subsection 4.3.5—Voltage Faults

Subsection 4.3.6—Low or No Power Output (DC Tests)

Subsection 4.3.7—Low or No Power Output (RF Tests)

4.3 Troubleshooting *(continued)*

4.3.1 "Power On" Indication Doesn't Display on Front Panel when POWER Switch is Depressed (Schematic No. 1009506)

4.3.1.1 If the Model 60S1G3 is operating in an otherwise normal fashion, the front panel display or the wiring to it could be defective.

4.3.1.2 Check the **LOCAL/REMOTE** switch on the unit's front panel; it must be set to the **LOCAL** position in order to operate the front panel **POWER** switch. Check the circuit breaker on the unit's rear panel; it must be set to the "**I**" ("ON") position.

4.3.1.3 If the **"Power On"** indication is not displayed and the cooling fans (Blowers B1, B2, B3) are not running, check to see that the unit is plugged into a live outlet and that the AC line cord is plugged securely into the unit.

4.3.1.4 Check the output voltages from PS1; these voltages should be as follows:

PS1 J2, Pin 1	+12.0 ± 0.3VDC
PS1 J2, Pin 2	+ 5.0 ± 0.2VDC
PS1 J2, Pin 6	-12.0 ± 0.3VDC

4.3.1.5 If output voltages are not present on PS1, check the AC input to PS1.

4.3.1.6 Check the voltages to the A21 Operate/Control Board on connector A21 J1; the voltages should be as follows:

A14 J1, Pin 16	-12.0 ± 0.3VDC
A14 J1, Pin 29	+ 5.0 ± 0.2VDC
A14 J1, Pin 31	+12.0 ± 0.3VDC

4.3.1.7 Check the voltage on A21 J1, Pin 6; it should be ≥4V when the **POWER** switch (S1) is in the normal position and <0.1V when S1 is depressed. S1 is normally open; it is closed only when it is depressed. The amplifier should change state every time the **POWER** switch is depressed.

4.3.1.8 If all voltages are correct and the unit still does not operate, contact Amplifier Research to arrange for repair or replacement of the A21 Operate/Control Board.

4.3.2 The Unit Cannot be Operated Remotely

4.3.2.1 Verify that the front panel **LOCAL/REMOTE** switch is set to the **REMOTE** position.

4.3.2.2 Verify that the unit operates locally by resetting the **LOCAL/REMOTE** switch to the **LOCAL** position; if the unit does not operate locally, see subsection **4.3.1** of this manual.

4.3 Troubleshooting *(continued)*

4.3.2 The Unit Cannot be Operated Remotely *(continued)*

4.3.2.3 Check the position of the **"ADDRESS"** switch assembly (SW1) on the A21 Operate/Control Board; this assembly can be accessed through the unit's rear panel. Check to see that these switches are properly set for either RS-232 or IEEE-488 operation, as desired. (See subsection **2.2.2** of this manual for the proper **"ADDRESS"** switch settings.) (**Note:** Address switches are only read at unit power-up; remove and re-apply AC power (i.e., reset the circuit breaker) after changes are made.)

4.3.3 Thermal Fault (Schematic No 1010522)

During a Thermal Fault, the front panel display should read **"Thermal Fault."**

4.3.3.1 Try to reset the unit; if the unit resets and operates normally, check to see that the cooling fans (B1, B2, B3) are operating normally and that the air inlet on the bottom of the unit and the air outlets on the rear of the unit are not blocked.

4.3.3.2 If the unit does not reset and the cooling fans are operating normally, check the voltage at the A21 Operate/Control Board, J1, Pin 4; it should be ≤0.1V.

4.3.3.3 If the voltage on A21 J1, Pin 4 is high, check the thermal daisy chain through S2 and S1, S3, S4 to ground.

4.3.4 Interlock Fault (Schematic No. 1010552)

The Model 60S1G3 is equipped with an interlock connector, which is located on the rear panel. The interlock circuit can be used to sense the openings of doors to screen rooms, test chambers, and so forth, and to turn off RF energy when these doors are opened.

Note: The Model 60S1G3 is shipped with a mating connector, which has a jumper between Pins 1 and 8, installed in the rear panel interlock connector. The unit will not operate unless the interlock circuit is closed.

4.3.4.1 In the event of an Interlock Fault, the front panel display should read **"INTERLOCK FAULT."**

4.3.4.2 Check to see if it is safe to be power up the unit—are there personnel present in the screen room, or are doors to the screen room open?

4.3.4.3 After checking for safety, try to clear the Interlock Fault from the front panel by using the **RESET** switch.

4.3.4.4 If the Interlock Fault will not clear, check for continuity in the External Interlock Circuit (Pin 1 to Pin 8 in the connector, which mate with J2 in the rear panel).

4.3 Troubleshooting *(continued)*

4.3.4 Interlock Fault (Schematic No. 1010552) *(continued)*

4.3.4.5 Check the voltage on A22 J1, Pin 18; it should be ≥4.0V.

4.3.4.6 Check the voltage on A21 J1, Pin 20; it should be ≥4.0V.

4.3.4.7 If all of the above voltages are correct and the unit still will not reset, check for defective wiring and/or PWB connections, then try the **RESET** switch again. If the unit still will not reset, the A21 Operate/Control Board is defective. Contact Amplifier Research to arrange for repair or replacement of the A21 Operate/Control Board.

4.3.5 Voltage Faults (Schematic Nos. 1010552 and 1009511)

The Model 60S1G3's fault circuits sense four voltage faults: **-5V, -15V, +15V, and +16.5V**. The -5V and -15V fault circuits are located on the A22 Regulator Control Board. The +15V and +16.5V fault circuits are located on the A21 Operate/Control Board.

4.3.5.1 -5V Faults: -5V faults are sensed by a fault circuit on the A22 Regulator/Control Board.

4.3.5.2 A22 U5B is a comparator that is used to sense -5V faults. This comparator's output is usually low.

4.3.5.3 The output of A22 U5B should go high if the -5V power supply ≤ 3.8V.

4.3.5.4 The output of A22 U5B is fed to the A21 Operate/Control Board via A21 J1, Pin 25.

4.3.5.5 If the output of A22 U5B is low and the -5V fault cannot be cleared, and the amplifier cannot be reset, then the A21 Operate/Control Board is defective. Contact Amplifier Research to arrange for repair or replacement of the A21 Operate/Control Board.

4.3.5.6 -15V Faults: -15V faults are sensed by a fault circuit on the A22 Regulator/Control Board.

4.3.5.7 A22 U5A is a comparator that is used to sense -15V faults. This comparator's output is usually low.

4.3.5.8 The output of A22 U5A should go high if the-15V power supply is ≤-12.2V.

4.3.5.9 The output of A22 U5A is fed to the A14 Operate/Control Board via A21 J1, Pin 40.

4.3.5.10 If the output of A22 U5A is low and the -15V fault cannot be cleared, and the amplifier cannot be reset, then the A21 Operate/Control Board is defective. Contact Amplifier Research to arrange for repair or replacement of the A21 Operate/Control Board.

4.3 Troubleshooting *(continued)*

4.3.5 Voltage Faults (Schematic Nos. 1010552 and 1009511) *(continued)*

4.3.5.11 +15V Faults: +15V faults are sensed by a fault circuit on the A21 Operate/Control Board.

4.3.5.12 If there is a +15V fault that cannot be cleared, check the voltage at A21 J1, Pin 9. If the voltage is >12.7V and the fault will not clear, check the adjustment of R22 on the A21 Operate/Control Board. If the problem cannot be corrected by adjusting R22, then the Operate/Control Board is defective. Contact Amplifier Research to arrange for repair or replacement of the A21 Operate/Control Board.

4.3.5.13 +16.5V Faults: +16.5V faults are detected by a fault circuit on the A21 Operate/Control Board.

4.3.5.14 If there is a +16.5V fault that cannot be cleared, check the voltage on A21 J1, Pin 10. If the voltage is >12.7V and the fault will not clear, check the adjustment of R23 on the Operate/Control Board.

4.3.5.15 If the voltage on A21 J1, Pin 10 is normal (>12.7V) and the fault cannot be cleared by adjusting R23, then the A21 Operate/Control Board is defective. Contact Amplifier Research to arrange for repair or replacement of the A21 Operate/Control Board.

4.3.6 Low or No Power Output (DC Tests) (Schematic No. 1010552)

All indicators on the Model 60S1G3 are normal, the front panel display reads **"Power On,"** and the cooling fans (Blowers B1 and B2, B3) are operating.

4.3.6.1 Check the position of the RF Gain control—is it set to maximum gain?

4.3.6.2 Check the RF input to the unit—is it the correct amplitude and frequency?

4.3.6.3 Check the RF output connection from the unit—is it correctly connected to the load? Is the coaxial cable okay?

4.3.6.4 Check the voltages on Connector J1 of the A3 Linearizer Control Circuit. Troubleshoot any incorrect voltages.

A3 J1, Pin 4 -15 ± 0.4V
A3 J1, Pin 5 15 ± 0.4V
A3 J1, Pin 6 -12.5 ± 1.5V (RF Gain control at maximum gain, input signal <-5dBm).

4.3 Troubleshooting *(continued)*

4.3.6 Low or No Power Output (DC Tests) (Schematic No. 1010552) *(continued)*

4.3.6.5 Check the voltages on the feed-through capacitors of the A1 Variable Gain Amplifier with the RF Gain control set for maximum gain. Troubleshoot any incorrect voltages.

A1 C12	-0.7 to -3.5V
A1 C13	4.3 ± 0.5V
A1 C11	-0.1 ± 0.05V
A1 C10	-1.5 ± 0.5V
A1 C9	-4.0 ± 1.0V

4.3.6.6 Check the voltages supplied to the A5 Bias Control Board. Troubleshoot any incorrect voltages.

A5, Pin 3	16.5 ± 0.5V
A5, Pin 1	-5 ± 0.4V

4.3.6.7 Check the voltages on the feed-through capacitors of the A4 One (1)-Watt Amplifier. Troubleshoot any incorrect voltages.

C3, C5, C7	-0.7 to -3.5V
A4 C4	7.6 ± 0.5V
A4 C6	10.2 ± 0.5V
A4 C8	10.2 ± 0.5V

4.3.6.8 Check the voltage on TP1 on the A6 Four (4)-Watt Amplifier; the voltage should be 10.4 ± 0.3V. If the voltage on TP1 is low, check the voltages on C1 and C4 of that amplifier.

4.3.6.9 Check the voltages on TP1 (C21) and TP2 (C22) on the A6, A8, A9, A12, A13, A14, A15, A16, A17, A18 and A19 Quadrature-Coupled Amplifiers ("Quad Amps"); the voltage should be 10.4 ± 0.3V. If any of the voltages on TP1 and TP2 are low, check the voltages on C1 and C4 of that amplifier.

TP1, TP2	10.9 ± 0.3V
C1	16.5 ± 0.3V
C4	-5 ± 0.3V

4.3.7 Low or No Power Output (RF Test) (Schematic No. 1010552)

Note: The DC Tests specified in subsections **4.3.6.1–4.3.6.8** should be completed before conducting the RF tests specified in the following subsections.

Phase matching must be maintained from the output of the A7 Two-Way Splitter to the input of the A20 Eight-Way Combiner; if coaxial cables are removed, they must be reinstalled in the same locations from which they were removed. Replacement coaxial cable assemblies must be the same lengths as the original ones.

4.3.6.2 Check the RF input to the unit—is it the correct amplitude and frequency?

4.3.6.3 Check the RF output connection from the unit—is it correctly connected to the load? Is the coaxial cable okay? Check the DC voltages at the following points:

4.3.6.4 Check the voltages on Connector J1 of the A3 Linearizer Control Circuit. Troubleshoot any incorrect voltages.

A3 J1, Pin 4	-15 ± 0.4V
A3 J1, Pin 5	15 ± 0.4V
A3 J1, Pin 6	-12.5 ± 1.5V ("GAIN" control at maximum gain. Input signal <-5dBm).

4.3.6.5 Check the voltages on the feed-through caps of the A1 Variable Gain Amplifier with the RF Gain control set for maximum gain. Troubleshoot any incorrect voltages.

A1 C12	-0.7 to -3.5V
A1 C13	4.3 ± 0.5V
A1 C11	-0.1 ± 0.05V
A1 C10	-1.5 ± 0.5V
A1 C9	-4.0 ± 1.0V

4.3.6.6 Check the voltages supplied to the A5 Bias Control Board. Troubleshoot any incorrect voltages.

A5, Pin 3	+16.5 ± 0.5V
A5, Pin 1	-5 ± 0.4V

4.3.6.7 Check the voltages on the feed-through caps of the A4 One (1)-watt Amplifier. Troubleshoot any incorrect voltages.

C3, C5, C7	-0.7 to -3.5V
A4 C4	7.6 ± 0.5V
A4 C6	10.2 ± 0.5V
A4 C8	10.2 ± 0.5V

4.3.6.8 Check the voltages on TP1 (C21) and TP2 (C22) on the A6, A8, A9, A12, A13, A14, A15, A16, A17, A18, and A19 Quadrature-Coupled Amplifiers ("Quad Amps"). The voltage should be 10.4 ± 0.3V. If any of the voltages on TP1 and TP2 are low, check the voltages on C1 and C4 of that amplifier.

TP1, TP2	10.9 ± 0.3V
C1	16.5 ± 0.3V
C4	-5 ± 0.3V

4.3.7 Low or No Power Output (RF Test) (Schematic No. 1010552)

NOTE: The DC Tests specified in Paragraphs 4.3.6–4.3.6.8 should be completed before conducting the RF tests specified in the following paragraphs.

Phase matching must be maintained from the output of the A7 Two-Way Splitter to the input of the A20 Eight-Way Combiner; if coaxial cables are removed, they must be reinstalled in the same location from which they were removed. Replacement coaxial cable assemblies must be the same lengths as the original ones.

4.3.7.1 The Model 60S1G3's typical Gain Response is shown in **Figure 4.3.7.1.** The actual gain may vary considerably from that shown in Figure 4.3.7.1, but it should be ≥48dB.

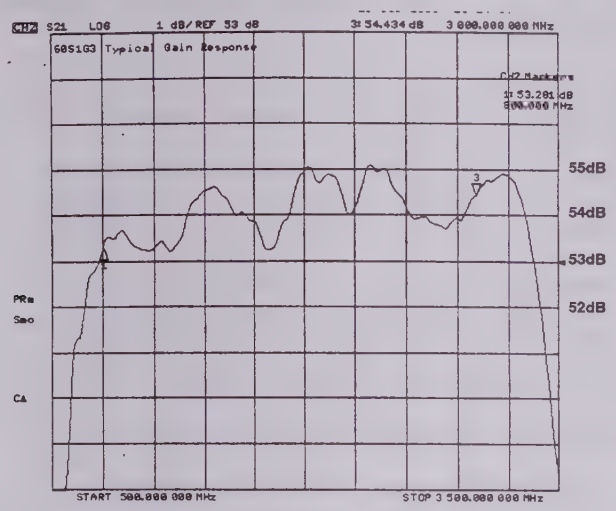


Figure 4.3.7.1
Typical Gain Response

NOTE: If the overall gain is low, the amplifier chain can be separated at the input to the A7 Two-Way Splitter and the gain checked from the input to the A7 Two-Way Splitter to the "OUTPUT" connector on the unit's front panel.

4.3.7.2 Remove the coaxial cable from the output of the A6 Quad Amp to the input of the A7 Two-Way Splitter. The typical response from the input of the A7 Two-Way Splitter to the "OUTPUT" connector on the unit's front panel is shown in **Figure 4.3.7.2.**

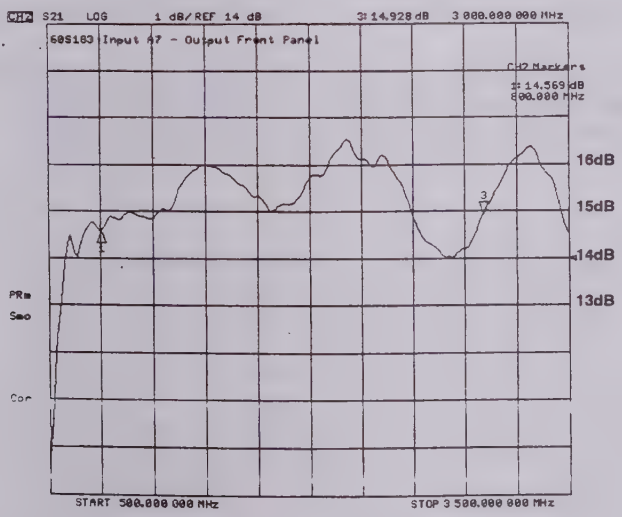


Figure 4.3.7.2
Typical Response: Input A7–Output Front Panel

If the response is normal, see **Paragraph 4.3.7.8**. If the response is abnormal, perform the following tests.

4.3.7.3 If the gain is slightly low (i.e., several dB below typical), try disconnecting the inputs from the A12, A13, A14, A15, A16, A17, A18, and A19 Quad Amps one at a time, then reconnect them. Note the difference in response when disconnecting the Quad Amps; if any Quad Amp causes less of a change in gain than the others, check the Quad Amp, coaxial cable, and so forth associated with that Quad Amp. Typical Quad Amp Response is shown in **Figure 4.3.7.3.**

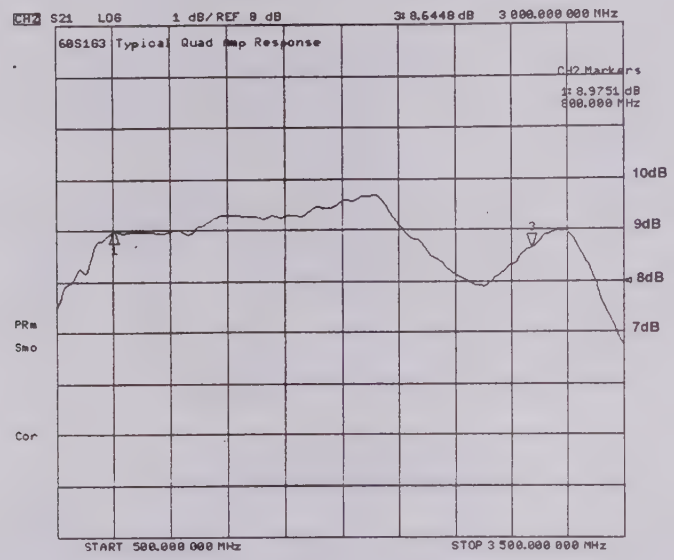


Figure 4.3.7.3
Typical Quad Amp Response

4.3.7.4 If the gain is 5dB or more below the typical response, do the following:

- Disconnect the coaxial cable from the input of the A8 Quad Amp, and note the results.
- Reconnect the coaxial cable from the input of A8 and disconnect the coaxial cable from the input of the A9 Quad Amp; the results should be similar. If not, check the side that made the least difference. Check the Two-Way Splitter, the Four-Way Splitter, the Quad Amp, and so forth.

4.3.7.5 A typical Two-Way Splitter Insertion Loss is shown in Figure 4.3.7.5. The unused port must be terminated when checking the insertion loss.

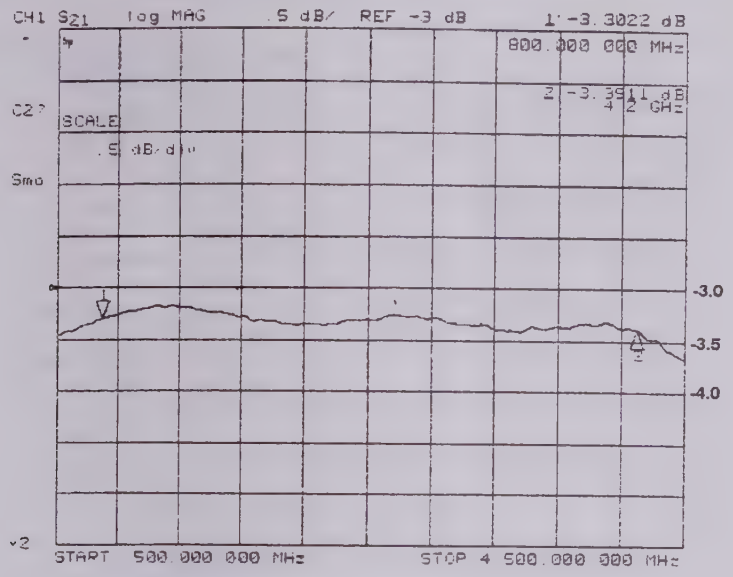


Figure 4.3.7.5
Typical Two-Way Splitter Insertion Loss

4.3.7.6 A typical Four-Way Splitter Insertion Loss is shown in **Figure 4.3.7.6.** The unused port must be terminated when checking the insertion loss.

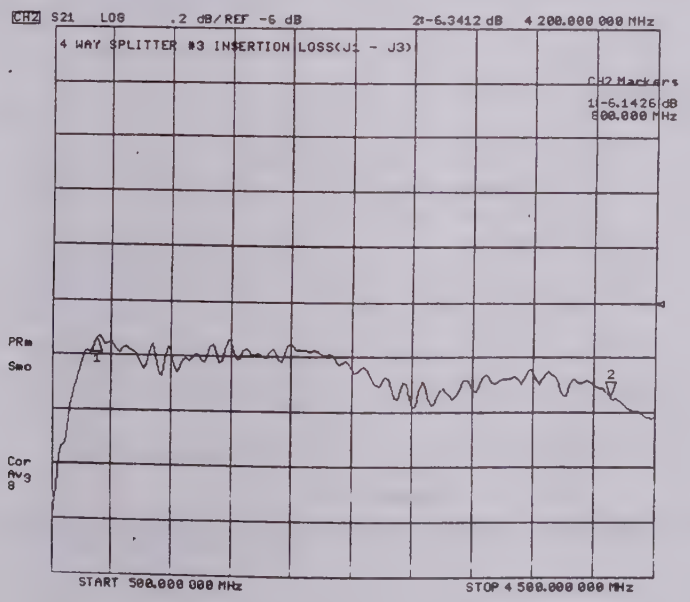


Figure 4.3.7.6
Typical Four-Way Splitter Insertion Loss

4.3.7.7 A typical Eight-Way Combiner Insertion Loss and Combined Port Return Loss is shown in **Figure 4.3.7.7.** The unused port must be terminated when checking the Insertion Loss.

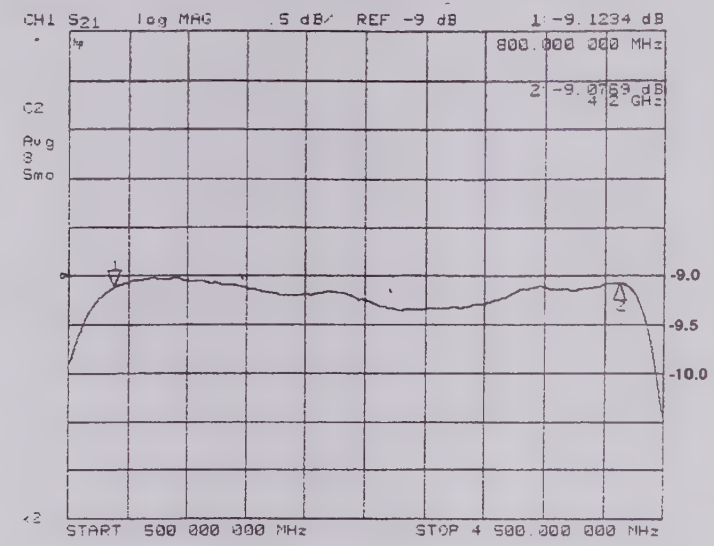


Figure 4.3.7.7
Typical Eight-Way Combiner Insertion Loss

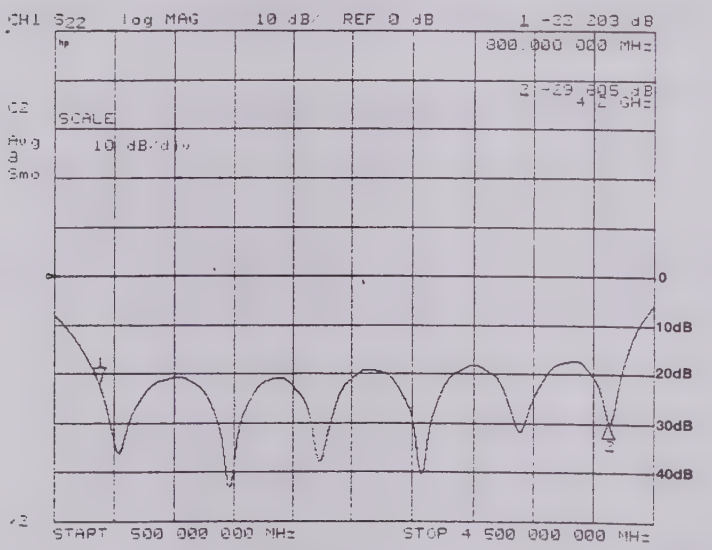


Figure 4.3.7.7
Typical Eight-Way Combiner Return Loss: Combined Output Port

NOTE: The Return Loss of the Eight-Way Combiner's combined output port is typically better than 17dB (see Figure 4.3.7.7). The Return Loss of the Eight-Way Combiner's eight input ports is approximately 2dB when one port is driven.

4.3.7.8 If the response of the output stages (A7 Two-Way Splitter input to front panel "OUTPUT") is normal, check the response of the A6 Quad Amp (see **Figure 4.3.7.8**).

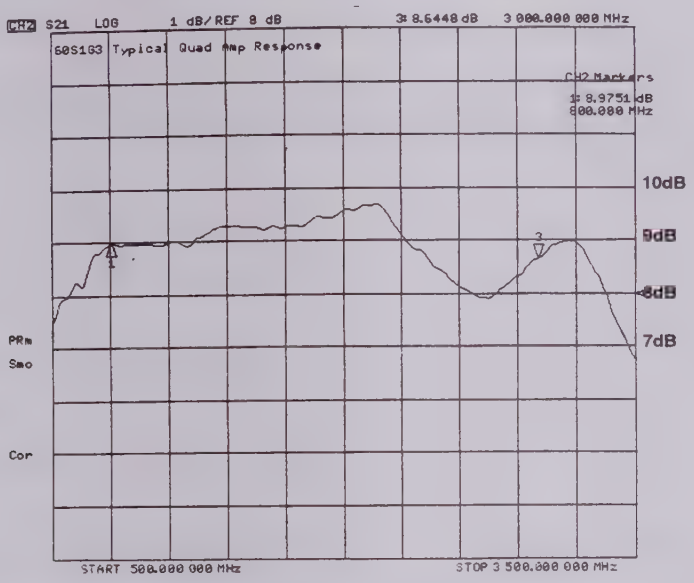


Figure 4.3.7.8
Typical Quad Amp Response

NOTE: The A4 One (1)-watt Amplifier's response or the A1 Variable Gain Amplifier's response may differ considerably—particularly in flatness—from the typical responses shown in the following Figures (4.3.7.9 and 4.3.7.10).

4.3.7.9 The typical response for the A4 One (1)-watt Amplifier is shown in **Figure 4.3.7.9.**

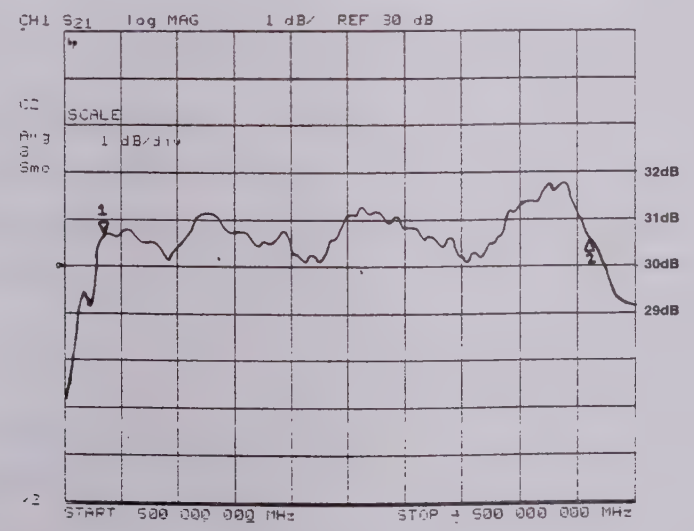


Figure 4.3.7.9
Typical A4 One (1)-Watt Amplifier Response

4.3.7.10 The typical response for the A1 Variable Gain Amplifier (at maximum gain setting) is shown in **Figure 4.3.7.10.**

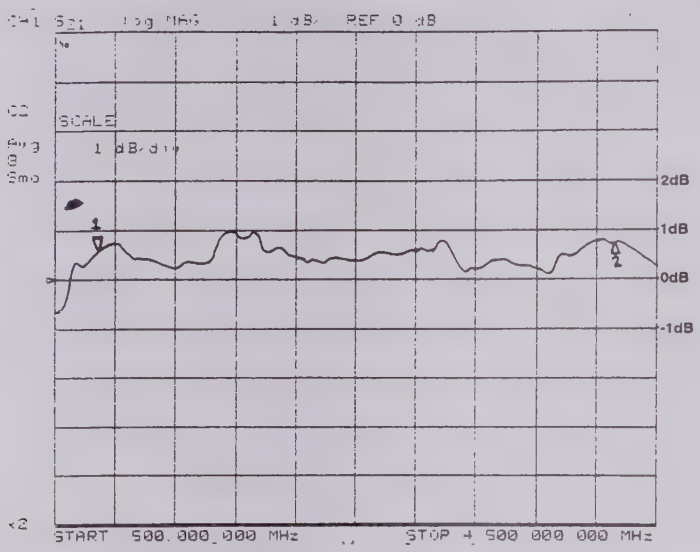


Figure 4.3.7.10
Typical A1 Variable Gain Amplifier Response

SECTION V

REPLACEABLE PARTS

5.1 INTRODUCTION

This section contains information for ordering replacement parts. Information is provided for obtaining parts through Amplifier Research and/or from the manufacturer of the part. Included in this section are the following:

- Ordering Information
- Non-Listed Parts
- Circuit Designators
- Manufacturers' Abbreviation Listing
- Master List
- Schematics and Bills of Material (BOMs)

5.2 ORDERING INFORMATION

To obtain replacement parts, address your order to Amplifier Research, 160 School House Road, Souderton, PA 18964-9990 USA. Please include the instrument's Model Number and Serial Number.

TEL: 215 723-8181

TWX: 510 661-6094

FAX: 215 723-5688

5.3 NON-LISTED PARTS

To obtain a part that is not listed in this section, please include the following information with your order:

a. Instrument Model Number

b. Instrument Serial Number

c. Description of the Part

d. Function and Location of the Part

5.4 CIRCUIT DESIGNATORS

REF = Reference Document

A = Assembly

B = Fan

BT = Battery

C = Capacitor

5.4 CIRCUIT DESIGNATORS *(CONTINUED)*

CB = Circuit Breaker

CR = Diode

DL = Delay Line

DS = Lamp

E = Terminal

F = Fuse

F = Filter

J = Connector, Recept.

K = Relay

L = Inductor

M = Meter

P = Connector, Plug

Q = Transistor, Semiconductor

R = Resistor, Potentiometer

RT = Temperature-Sensing Element

S = Switch

T = Transformer

TB = Terminal Block

TP = Test Point

U = Integrated Circuit

V = Vacuum Tube, Neon Bulb, Photocell, etc.

VR = Zener Diode

W = Wire, Cable

X = Socket

Y = Crystal Unit

5.5 MANUFACTURERS' ABBREVIATION LISTING

This section contains a list of manufacturers' abbreviations. These abbreviations appear under the "Drawing Number" column on the Bills of Material (BOMs). The three letters or symbols before the backward slash represent the name of the manufacturer. The number after the backward slash represents the manufacturer's part number. See **Appendix A** (at the end of this section) for a complete listing of manufacturers' abbreviations.

5.6 MASTER LIST

The Master List provides the user with a quick view of the major assemblies of a unit. The assemblies are displayed in an indented format, with the corresponding schematic shown in the right column.

5.7 SCHEMATICS AND BILLS OF MATERIAL (BOMS)

The schematics and BOMs are arranged in sequence according to the Master List. The schematic that appears first on the Master List also appears first in the schematic and BOM section. Following each schematic are the appropriate BOMs relating to the schematic. This pattern is repeated throughout this section.

The BOMs used in this manual are computer-generated. Each computer part number appears only once on a BOM, along with the total quantity used and all of the applicable circuit designators. The BOMs are designed to organize the parts in alphanumeric order of their circuit designators. Typical manufacturer part numbers can be found in the drawing number column. The manufacturer's abbreviation appears first, separated by a backward slash, which is followed by the part number.

Amplifier Research has assigned computer product numbers to all parts in inventory. The computer product numbers are located on the left side of the BOM in the "Part Number" field. When referencing or ordering parts from Amplifier Research, it is best to use the computer product number. Parts may also be ordered directly from the manufacturer by using the manufacturer's part number, if desired.

AAV ..... AAVID
ABB ..... ABBEON
ACA ..... ANTENNA CORPORATION OF AMERICA
ACO ..... ARCO
ADA ..... ADALET
AND ..... ASTRO DYNE
AEC ..... ARNOLD ENGINEERING COMPANY
AEP ..... APPLIED ENGINEERING PRODUCTS
AER ..... AEROQUIP
AEX ..... AEROVOX
AHC ..... AIRLINE HYDRAULICS CORPORATION
AIN ..... AIN PLASTICS
AIR ..... AIRPAX
AIT ..... AERITALIA
AJO ..... A. J. OSTER FOILS INCORPORATED
ALC ..... ALCO
ALE ..... ALLIED ELECTRONICS
ALI ..... ASTROLAB INCORPORATED
ALP ..... ALPHA
AMA ..... AMATOM
AMC ..... AMPEX CORPORATION
AMH ..... AMPHENOL
AMI ..... AMPLIFONIX INCORPORATED
AMP ..... AMP INCORPORATED
AMR ..... AMREP
AMS ..... AMERICAN STANDARD
AND ..... ANALOG DEVICES
ANZ ..... ANZAC
APG ..... AP-O-GEE INDUSTRUES
APN ..... AMERICAN PRECISION
APO ..... AMPROBE
APP ..... A. P. PRODUCTS INCORPORATED
APR ..... AMPERITE
APX ..... AMPEREX
ARC ..... AMPLIFIER RESEARCH CORPORATION
ARE ..... ARROW ELECTRONICS
ARO ..... AROMAT CORPORATION
ARP ..... APPLE RUBBER PRODUCYS INCORPORATED
ASB ..... ASTRO-BUBBLES
ASC ..... AMERICAN SWITCH CORPORATION
ASD ..... AMERICAN STANDARD
ASP ..... ASSOCIATED SPRING
AST ..... ASTEC
ATC ..... AMERICAN TECHNICAL CERAMICS CORPORATION
ATL ..... ATLEE
AUG ..... AUGAT INTERCONN COMP DIVISION
AVA ..... AVA CORPORATION
AVF ..... ALLENTOWN VALVE & FITTING COMPANY
AVT ..... AVANTEK
AVX ..... AVX CORPORATION
A-B ..... ALLEN BRADLEY
A-C ..... ANDREW CORPORATION
A-M ..... AEC MAGNETICS
A-S ..... ALCOSWITCH

A-T	AHAM-TOR
BBI	BARON-BLAKSLEE INCORPORATED
BDX	BENDIX
BEG	BERG CORP
BEL	BELDEN
BER	BERKLEY & COMPANY
BEY	BEY ELECTRIC
BFG	B.F. GOODRICH
BFI	BUCKEYE FORGE INCORPORATED
BKM	BECKMAN
BLL	BELLING LEE
BOK	BOKER'S INCORPORATED
BOP	BOPLA ENCLOSURES
BOR	BOURNS
BRD	BIRD ELECTRONICS
BRG	BERGQUIST
BUD	BUD COMPANY
BUL	BULGIN
BUS	BUSS
B-C	BONCO CORPORATION
B-E	BRIM ELECTRONICS
B-T	BEAU-TECH
B-V	BEAU/VERNITRON
CAD	CADDOCK
CAM	CAMBION
CAN	CANNON
CAP	CANPACK
CAR	CARLING
CAT	CATAMOUNT
CCI	CRL COMPONENTS INCORPORATED
CDC	COMPACT DEVELOPMENT CORPORATION
CDI	COAXIAL DYNAMICS INCORPORATED
CEN	CENTURY ELECTRONICS
CES	COUNTY ELECTRIC SUPPLY COMPANY
CGI	COMPONENT GENERAL INCORPORATED
CHE	CHERRY
CHO	CHOMERICS
CHR	CONNETICUT HARD RUBBER
CIN	CINCH
CJS	CENTRAL JERSEY SCREW & BOLT
CKS	C & K COMPONENTS INCORPORATED
CLA	CLAROSTAT
CLC	CHICAGO LOCK COMPANY
CMI	CERAMIC MAGNETICS INCORPORATED
CMP	COMMERCIAL PLASTICS
CMT	CONTINENTAL MICROWAVE & TOOL
CNF	CINCINNATI FAN
COE	COMP ENTERPRISES
COL	COLDER PRODUCTS
COM	COMPUCON
CON	CONCORD ELECTRONICS
COP	COMPLETE PACKAGING
COR	CORCOM
CPC	C.P. CLARE

CPI.....COMPUTER PRODUCTS INC.
CPL.....COMPULITE
CPS.....COLOR PRINT SCREENING
CRC.....CRC CHEMICALS
CTS.....CTS OF BERNE INCORPORATED
CUS.....CUSTOM
C-D.....CORNELL-DUBILIER
C-E.....CORNING ELECTRONIC
C-I.....CRAFTECH INDUSTRIES
C-P.....CAPLUG COMPANY
C-T.....CANADIAN THERMOSTATS
CWD.....CESIWID INCORPORATED
DAL.....DALE
DAT.....DATEL INC
DEL.....DELKER
DAY.....DAYTON
DEN.....DENNISON
DIA.....DIALIGHT
DII.....DATONA INDUSTIRES INCORPORATED
DIL.....DIELECTRIC LABS
DKK.....DOW KEY/KILOVAC
DLS.....DALLAS SEMICONDUCTOR
DLT.....DELTRON
DSC.....DE-STA-CO
DTP.....DOYLESTOWN PRINTING
DUP.....DU PONT ELECTRONICS
DYN.....DYNATECH
D-E.....DARBURN ELECTRONICS
D-G.....DIMCO-GRAY
D-K.....DIGI-KEY-CORPORATION
EBM.....EBM IND.
ECO.....EATON CORPORATION
ECS.....ECS INTERNATIONAL
EFJ.....E.F.JOHNSON
EGG.....EG & G OPTOELECTRONICS
EGL.....ELGAL
EIC.....ELCTRO INSULATION CORPORATION
EII.....EDAL INDUSTRIES INC.
EIM.....EIMAC
ELC.....ELECTRO SWITCH CORPORATION
ELM.....ELMENCO
ELR.....ENGLER INSTRUMENT
EMC.....E.M.C. TECHNOLOGY
EMI.....ELECTRONIC MEASUREMENTS,INC.
EMM.....ENGLEMANN MICROWAVE
EOD.....ELECTRO-OPTIC DEV
ERI.....ERIE TECHNOLOGY PRODUCTS
ERM.....EREM CORPORATION
ESX.....ESSEX
ETA.....ETA
EVE.....EVEREST ELECTRONIC EQUIPMENT
EVR.....EVEREADY
EWS.....ELMWOOD SENSOR
E-C.....EMERSON AND CUMMING

EZF ..... EZ FORM CABLE CORPORATION
FAR ..... FARNELL COMPONENTS
FCH ..... FAIRCHILD
FCI ..... FILTER CONCEPTS INCORPORATED
FER ..... FERRONICS
FEX ..... FERROXCUBE
FLO ..... FLO TRAN PNEU-DRAULICS INCORPORATED
FLP ..... FLURO PLASTICS
FOS ..... FIBRE OPTIC COMMUNICATION SPECIALTIES
FRA ..... FRANZUS
FRK ..... FROST KING
FRM ..... FREEDMAN/MALTA
FRP ..... FAIR-RITE PRODUCTS
FUJ ..... FUJITSU
FWC ..... FW CAPACITORS
F-S ..... FASTENER SPECIALTY
GAL ..... GALLAGER
GCE ..... G.C. ELECTRONICS
GCS ..... GLOBAL COMPUTER SALES
GEM ..... GEM
GDC ..... GENERAL DEVICES CO.
GOL ..... GOLDKAMP
GRA ..... GRAINGER
GRE ..... GREYARC
GRS ..... GENERAL RADIO SUPPLY
GRY ..... GRAYHILL CORP
GSI ..... GSI
GTL ..... GILWAY TECHNICAL LAMP
G-E ..... GENERAL ELECTRIC COMPANY
G-I ..... GENERAL INSTRUMENT
GUD ..... GUDEN
HAD ..... HARRY DAVIES
HAN ..... HANSON
HAR ..... HARRIS CORP
HAV ..... HAVERHILL CABLE AND MANUFACTURING
HDB ..... HOMER D. BRONSON
HEC ..... HIGH ENERGY CORPORATION
HEI ..... HEINEMANN
HEY ..... HEYCO MOLDED PRODUCTS
HEX ..... HEXACON
HHS ..... H.H. SMITH
HII ..... HOLODAY INDUSTRIES INCORPORATED
HIM ..... HITACHI MAGNETS
HMF ..... HILTON MANUFACTURING
HMN ..... HENRY MANN
HOF ..... HOFFMAN PRODUCTS
HOL ..... HOLLINGSWORTH
HOW ..... HONEYWELL
HPC ..... H.P.CADWALLADER
HSI ..... HUBER & SUHNER INCORPORATED
HUB ..... HUBBEL
HUC ..... HUDSON CAN COMPANY
HUV ..... HANDLES UNLIMITED VERMALINE DIV.
HWK ..... HAWKINS METAL FABRICATION

H-C ..... HARTWELL CORP. COMMERCIAL DIVISION
H-P ..... HEWLETT/PACKARD
H-R ..... HERBACH & RADEMAN
IBM ..... IBM
ICI ..... ILLINOIS CAPACITOR INCORPORATED
IDE ..... IDEAL
IER ..... IERC
ILS ..... ILSCO
IMB ..... IMB
IMC ..... IMC
IML ..... IMLEC
INC ..... INTERNATIONAL CRYSTAL MFG COMPANY
INM ..... INMET
INT ..... INTERMATIC INC
IPI ..... INSULFAB PLASTICS INCORPORATED
IRC ..... INTERNATIONAL RESISTIVE COMAPNY, INC.
IRM ..... IR-CRYDOM
ITF ..... ITERFAN
ITJ ..... ITT-JENNINGS
ITT ..... ITT CANNON
I-E ..... IMPERIAL EASTMAN
I-G ..... INDIANA GENERAL
I-R ..... INTERNATIONAL RECTIFIER CORPORATION
I-S ..... INSTRUMENT SPECIALTIES
JAR ..... J.A. REINHARDT
JDE ..... JOHANSON DIELECTRICS
JER ..... JERGENS INCORPORATED
JFD ..... JFD
JOH ..... JOHANSON
JON ..... JONATHAN MANUFACTURING
JOR ..... JORITA
JSR ..... JAY-CEE SALES & RIVET INC.
KCC ..... KEYSTONE CARBON COMPANY
KEY ..... KEYSTONE ELECTRONICS
KIN ..... KINGS
KLE ..... KLEIN
KSD ..... KESTER SOLDER DIVISION
KUL ..... KULKA
K-D ..... KD COMPONENTS
LAF ..... LAFRANCE CORPRATION
LBA ..... LAMBDA ELECTRONICS INCORPORATED
LEM ..... LIAISONS ELECTRONIQUES MECHANIQUES
LEV ..... LEVITON MANUFACTURING COMPANY
LIF ..... LITTLEFUSE
LOC ..... LOCTITE CORPORATION
LOR ..... LORD CORPORATION
LTC ..... LINEAR TECHNOLOGY COPR
MAC ..... MACOM
MAL ..... MALLORY
MAR ..... MARKEL CORPORATION
M-C ..... MICROCHIP
MCG ..... McGILL
MCR ..... MICREL INCORPORATED
MCS ..... McMASTER CARR SUPPLY COMPANY

MCX..... MICRO-COAX
MDC..... MICROWAVE DEVELOPMENT CO.
MDP.....MODPAK
MEA..... MITSUBISHI ELECTRONICS AMERICA, INC.
MEP ..... MEPCO-ELECTRA
MET ..... METUCHEN CAPACITOR
MFG ..... MANUFACTURER
MHW .....M.H. & W. COMPANY
MIC .....MICROMETALS IRON POWDER CORES
MIN..... MINI-CIRCUITS
MIP .....MICRO PLASTICS
MIR ..... MINOR RUBBER COMPANY
MIS .....MICROSWITCH
MIT ..... MULTITHERM CORPORATION
M-K..... MK
MLC ..... M. LADER COMPANY
MLX..... MILL-MAX CORP
MMI .....MAGNETIC METALS INCORPORATED
MMM.....MINNESOTA MINING MANUFACTURING
MOC.....MOCAP
MOD ..... MODUTEC
MOL.....MOLEX
MOR.....MORS COMPONENTS INC
MON ..... MONSANTO
MOS.....M/A-COM OMNI SPECTRA INCORPORATED
MOT..... MOTOROLA
MPC ..... MULTI-PRODUCTS
MRS .....MARSH
MSC ..... MICROSEMI CORPORATION
MUE..... MUELLER
MUR.....MURATA/ERIE
MWA ..... MICROWAVE ASSOC
MWC.....MIDWEST COMPONENTS
MWM.....MIDWEST MICROWAVE
MWS ..... MICROWAVE SEMI-CONDUCTORS
M-C ..... M & C SPECIALTIES
M-E .....MASTER ELECTRICIAN
M-M .....MULTI-MAX CORPORATION
NAB ..... NORTH AMERICAN BRASS AND COPPER
NEB..... NEBS INCORPORATED
NET.....NETEK
NEW.....NEWAGE INDUSTRIES
NIA ..... NIAGRA PLASTICS
NIC..... NIC COMPONENTS
NIE..... NIELSEN HARDWARE
NJS.....N.J. SEMI
NKK..... NKK SWITCHES
NMB..... NMB TECHNOLOGIES INCORPORATED
NOB ..... NOBLITT BROTHERS & COMPANY
NOR .....NORITAKE
NPP .....NORTH PENN POLISHING & PLATING
NSI .....NATIONAL SEMI-CONDUCTOR CORPORATION
NVS..... NORTHAMPTON VALLEY SERVICE COMPANY
N-I.....NATIONAL INSTRUMENTS

N-M ..... NATIONAL MOLDITE
N-P ..... NEM-PACK
OAP ..... OLEAN ADVANCED PRODUCTS
OHA ..... OHIO ART
OHN ..... OHMLITE
OKI ..... OK INDUSTRIES
OME ..... OMEGA
OMR ..... OMRON
OPM ..... OPTIMA
OPT ..... OPTIMAX
PAE ..... PACIFIC ELECTRICORD
PAJ ..... PHILLIPS AND JACOBS
PAM ..... PAMOTOR
PAN ..... PANASONIC
PAP ..... PAPST
PBC ..... POTTER & BRUMFIELD CORPORATION
PCI ..... PENN CRAFT INDUSTRIES
PEC ..... PENN CONTROLS
PCC ..... PANEL COMPONENTS CORPORATION
PEK ..... PEAK
PEN ..... PENN ENGINEERING
PFL ..... POLYFLON
PFS ..... POWER FILM SYSTEMS
PHC ..... PARKER HANNIFIN CORPORATION
PHI ..... POWER HYBRID
PLM ..... PLASTIC & METALS
PMP ..... PRECISION METAL PROD.
PMI ..... PRECISION MONOLITHICS INC.
PNT ..... PANDUIT
P-O ..... POWER ONE
POW ..... POWEREX
PRC ..... PRECISION RUBER COMPANY
PSI ..... POWER SEMI-CONDUCTOR INCORPORATED
PSP ..... PROJECT SUPPORT INCORPORATED
PTC ..... PRECISION TUBE COMPANY
P-B ..... PENN-BASCO
QUI ..... QUICKSET
RAA ..... RADIALL
RAF ..... R.A.F. ELECTRONIC HARDWARE INCORPORATED
RCA ..... RCA
RCC ..... RAYCHEM CORPORATION
RCL ..... RCL
REL ..... RELIANCE MICA COMPANY
REM ..... REMTEK
RES ..... ROSE ENCLOSURES SYSTEMS
RFP ..... RF POWER COMPONENRS INC
RIC ..... RICHCO
ROG ..... ROGAN
RON ..... RONCO CORPORATION
ROS ..... ROSS ENGINEERING
ROT ..... ROTRON
ROW ..... ROWLAND
RPC ..... REPUBLIC PACKAGING CORPORATION
RUS ..... RUSSEL INDUSTRIES

R-H.....RYAN HERCO
R-N.....ROBINSON-NUGENT
R-S.....RADIO SHACK
SAG.....SAGE LABORATORIES
SAM.....SAMTECH
SBC.....SCHROEDER BROTHERS CORPORATION
SCD.....SCHADOW
SCH.....SCHAUER
SCI.....SPECTRUM CONTROL INCORPORATED
SCO.....SCOTCH
SEA.....SEASTROM INCORPORATED
SEL.....SELECTRO CORPORATION
SEM.....SEMIKRON
SEV.....SEVENTY-THREE MANUFACTURING COMPANY
SGL.....SGL INDUSTRIES
SGS.....SGS
SIE.....SIEMENS
SIG.....SIGNETICS
SIM.....SIMPSON
SLE.....SL ELECTRONICS
SOC.....SOUTHCO
SOE.....STANDARD OIL ENGINEERING
SOH.....SOHIO
SOL.....SOLDAPULLT
SOW.....SOLDER WICK
SPC.....SPC TECHNOLOGY
SPE.....SPECTROL
SPL.....SPRA-LUBE
SPR.....SPRAGUE
SPS.....SPRINGFIELD PAPER SPECIALISTS
SQR.....SQR SECURITY COMPONENTS
SSI.....SWITCHING SYSTEMS INTERNATIONAL
SSM.....SOLD STATE MICROWAVE
SSS.....S & S TECH
SST.....SST
STA.....STANCOR
STB.....SEAL-TITE BAG COMPANY
STI.....STIMPSON
STM.....SEASTROM MANUFACTURING COMPANY
STP.....STACKPOLE
STW.....STOCKWELL
SUS.....SUNSHINE SCIENTIFIC
SWC.....SWITCHCRAFT
SHW.....STEWERT-WARNER HOBBS DIVISION
S-B.....SPEED BEND
S-E.....STEMCO/ENGLER
S-F.....SYDNEY FRIEDRICH
S-L.....SWAGELOCK
S-M.....STRIP-MASTER
TAB.....THOMAS & BETTS
TAI.....TAI CORPORATION
TAN.....TANSISTOR
TCC.....THOMSON PASSIVE COMPONENTS CORP
TCI.....TRA-CON INCORPORATED

TEC ..... TECKNIT
TEL ..... TELEFUNKEN
TEM ..... TEMPIL
TET ..... TECHNITOOL
TFI ..... THRUWAY FASTNERS INCORPORATED
THM ..... THERMALLOY
THS ..... THREADED SCREW PRODUCTS COMPANY
TII ..... TEXAS INSTRUMENTS INCORPORATED
TMS ..... TIMES MICROWAVE SYSTEMS
TRD ..... TRIAD
TRI ..... TRI-COUNTY
TRS ..... TRI-STATE
TRT ..... TRAVERS TOOL COMPANY
TRU ..... TRU CONNECTORS
TRW ..... TRW
TUS ..... TUSONIX
TXS ..... TEXAS SPECTRUM
T-P ..... THOMAS PRODUCTS
UEC ..... UNITED ELECTRIC
ULI ..... ULINE
UNC ..... UNICORP
UN ..... UNELCO
UNI ..... UNIROYAL
UNM ..... UNIMEC
USC ..... USECO
UTI ..... UTICA
V-C ..... VICOR INC.
VFL ..... VITAFOAM LIMITED
VIC ..... VICTOREEN
VIT ..... VITRAMON
VLR ..... VLEIR
VOL ..... VOLTRONICS CORPORATION
WAG ..... WAGO COPR
WAK ..... WAKEFIELD
WAL ..... WALDOM
WCO ..... WECO
WEC ..... WESTERN ENTERPRISES COMAPNY
WEI ..... WEICO
WEL ..... WELLER
WES ..... WEINSTEIN
WGV ..... WARREN G-V
WIE ..... WIELAND
WIL ..... WILTRON
WIS ..... WEBER INDUSTRIAL SUPPLY COMPANY
WIT ..... WITTEK DIVISION, A MICRODOT COMPANY
WPI ..... WIRE PRODUCTS INCORPORATED
WPS ..... WORKPLACE SYSTEM
WSC ..... WEST POINT SUPPLY COMPANY
WWP ..... WESTERN WIRE PRODUCTS
W-E ..... WELLS ELECTRONIC INCORPORATED
W-I ..... WEIDMULLER INCORPORATED
W-L ..... WARD LEONARD
XAC ..... X-ACTO
XCA ..... XCELITE

YNG ..... YOUNGS
YPC ..... YARDLEY PRODCTS CORPORATION
ZER ..... ZERO MANUFACTURING COMPANY
ZIE ..... ZIERIC

BILL NO: 1011533-501M REV: - U/M: EA DRAWING NO:
MDL,MODEL 60S1G3M2

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
5000	1011528-501	-	MODEL 60S1G3M2,0.8-3.0 GHz,60 WATTS CW	EA	REF	ARC-D\1010643	BOM
5005	1010552	B	SCHEM DIAG,50S1G4A	EA	REF	ARC-D\1010552	R(B)
5010	1010643	-	ASSY DWG,MODEL 60S1G3	EA	REF	ARC-D\1010643	R(B)
5020	1010643-501	B	MODEL 60S1G3,1.0-3.0GHz,60 WATTS	EA	REF	ARC-D\1010643	BOM
5030	1010882	-	ASSY DWG,FINAL,60S1G3	EA	REF	ARC-D\1010882	R(B)
5040	1010882-501	-	FINAL ASSY,60S1G3	EA	REF	ARC-D\1010882	BOM
5050	1010883	A	ASSY DWG,AMP	EA	REF	ARC-D\1010883	R(B)
5060	1010883-501	B	AMP ASSY	EA	REF	ARC-D\1010883	BOM
5080	1008975-501	-	CABLE ASSY,COAX,SEMI-RIGID,SMA,SMA,5.5"	EA	REF	ARC-B\1008975	BOM
5090	1008975-502	-	CABLE ASSY,COAX,SEMI-RIGID,SMA,SMA,6.0"	EA	REF	ARC-B\1008975	BOM
5100	1008976-501	-	CABLE ASSY,COAX,SEMI-RIGID,SMA,SMA,3.5"	EA	REF	ARC-B\1008976	BOM
5105	1008976-502	-	CABLE ASSY,COAX,SEMI-RIGID,SMA,SMA,4.0"	EA	REF	ARC-B\1008976	BOM
5110	1008781	-	ASSY DWG,CABLE ASSY	EA	REF	ARC-B\1008781	B
5120	1008781-501	-	CABLE ASSY,COAX,SEMI-RIGID	EA	REF	ARC-B\1008781	BOM
5130	1008782	-	ASSY DWG,CABLE ASSY	EA	REF	ARC-B\1008782	B
5140	1008782-501	-	CABLE ASSY,COAX,SEMI-RIGID	EA	REF	ARC-B\1008782	BOM
5150	1010564	C	ASSY DWG,RF LOW LEVEL	EA	REF	ARC-D\1010564	R(B)
5160	1010564-501	D	RF,LO LEVEL ASSY	EA	REF	ARC-D\1010564	BOM
5170	1010568-501	B	HARNESS ASSY,LO LEVEL	EA	REF		BOM
5180	1008816	A	SCHEMATIC,VAR GAIN,PROTECTOR CIRCUIT	EA	REF	ARC-D\1008816	R(B)
5190	1008812	-	SCHEM DIAG,VARIABLE GAIN AMP/DET	EA	REF	ARC-D\1008812	R(B)
5200	1008810	E	ASSY DWG,VARIABLE GAIN AMP/DET	EA	REF	ARC-D\1008810	R(B)
5210	1008810-501	C	PWB ASSY,VARIABLE GAIN AMP/DET	EA	REF	ARC-D\1008810	BOM
5220	1008805-501	-	HARNESS ASSY,PRE-AMP\LEVELER	EA	REF		BOM

BILL NO: 1011533-501M REV: - U/M: EA DRAWING NO:
MDL,MODEL 60S1G3M2

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
5230	1007392	F	SCHEM DIAG,LINEARIZER CONT.	EA	REF	ARC-C\1007392	R(A)
5240	1007454	E	ASSY DWG,PWB ASSY,LINEARIZER/CTRL BD	EA	REF	ARC-B\1007454	B
5250	1007454-501	H	PWB ASSY,LINEARIZER/CTRL BD	EA	REF	ARC-B\1007454	BOM
5260	1010749	B	SCHEM DIAG,BIAS CTRL	EA	REF	ARC-B\1010749	B
5270	1010591	-	SCHEM DIAG,LOW LEVEL "S" MODULE	EA	REF	ARC-B\1010591	B
5280	1010589	C	ASSY DWG,LOW LEVEL "S" MODULE	EA	REF	ARC-C\1010589	R(A)
5290	1010589-501	B	PWB ASSY,LOW LEVEL "S" MODULE	EA	REF	ARC-C\1010589	BOM
5300	1008806-501	C	HARNESS ASSY,1 WATT AMP	EA	REF		BOM
5310	1010902	A	SCHEM DIAG,BIAS CONTROL	EA	REF	ARC-B\1010902	B
5320	1010748	A	ASSY DWG,BIAS CTRL,1W S MODULE	EA	REF	ARC-C\1010748	R(A)
5330	1010748-501	B	PWB ASSY,BIAS CTRL,1W S MODULE	EA	REF	ARC-C\1010748	BOM
5335	1008632	-	SCHEM DIAG,2 WAY SPLITTER	EA	REF	ARC-B\1008632	B
5340	1008630	-	ASSY DWG,2 WAY SPLITTER	EA	REF	ARC-B\1008630	B
5350	1008630-501	-	PWB ASSY,2 WAY SPLITTER	EA	REF	ARC-B\1008630	BOM
5360	1010571	A	ASSY DWG,AUX RF LOW LEVEL	EA	REF	ARC-B\1010571	B
5370	1010571-501	B	AUX RF LOW LEVEL ASSY	EA	REF	ARC-B\1010571	BOM
5380	1010919	-	SCHEMATIC,QUAD AMP	EA	REF	ARC-C\1010919	R(A)
5390	1010886	A	ASSY DWG,PWB,QUAD AMP	EA	REF	ARC-A\1010886	A
5400	1010886-501	C	PWB ASSY,QUAD AMP	EA	REF	ARC-A\1010886	BOM
5410	1010072	A	ASSY DWG,4 WAY SPLITTER #3	EA	REF	ARC-D\1010072	R(A)
5420	1010072-501	A	PWB ASSY,4 WAY SPLITTER #3	EA	REF	ARC-D\1010072	BOM
5425	1010074	-	SCHEM DIAG,4 WAY SPLITTER #3	EA	REF	ARC-B\1010074	B
5430	1010885	-	ASSY DWG,RF FINAL	EA	REF	ARC-D\1010885	R(B)
5440	1010885-501	-	RF ASSY,FINAL	EA	REF	ARC-D\1010885	BOM

BILL NO: 1011533-501M REV: - U/M: EA DRAWING NO:
MDL,MODEL 60S1G3M2

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
5450	1007409	C	ASSY DWG,COMBINER ASSY,8 WAY	EA	REF	ARC-C\1007409	R(B)
5460	1007409-501	C	COMBINER ASSY,8 WAY	EA	REF	ARC-C\1007409	BOM
5470	1010554	B	ASSY DWG,PS	EA	REF	ARC-D\1010554	R(B)
5480	1010554-501	B	PS ASSY	EA	REF	ARC-D\1010554	BOM
5490	1010555-501	A	HARNESS ASSY,PS,50S1G4A	EA	REF		BOM
5500	1010553	B	ASSY DWG,CTRL PNL	EA	REF	ARC-D\1010553	R(B)
5510	1010553-501	B	CTRL PNL ASSY	EA	REF	ARC-D\1010553	BOM
5520	1008597	B	SCHEM DIAG,OPERATE/CONTROL(OCB)	EA	REF	ARC-D\1008597	R(D)
5530	1008595	D	ASSY DWG,OPERATE/CONTROL(OCB)	EA	REF	ARC-C\1008595	R(D)
5540	1008595-501	C	PWB ASSY,OPERATE/CONTROL(OCB)	EA	REF	ARC-C\1008595	BOM
5550	1009511	-	SCHEM DIAG,REG CTRL BD	EA	REF	ARC-C\1009511	R(A)
5560	1009512	-	ASSY DWG,REG CTRL BD	EA	REF	ARC-C\1009512	R(A)
5570	1009512-501	-	REG CTRL BD ASSY	EA	REF	ARC-C\1009512	BOM

AMPLIFIER RESEARCH

09:50:50 06 DEC 2000 *** SINGLE LEVEL BILL OF MATERIAL LISTING *** REPORT: E0056 PAGE: 1

BILL NO: 1011528-501 REV: - U/M: EA DRAWING NO: ARC-D\1010643
MODEL 60S1G3M2,0.8-3.0 GHz,60 WATTS CW

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
5000	1010643-501	B	MODEL 60S1G3,1.0-3.0GHz,60 WATTS	EA	1.000	ARC-D\1010643	
5010	1011320-123	E	PL,MODEL NO,60S1G3M2	EA	1.000	ARC-A\1011320	
5020	1011533-501		MANUAL,MODEL 60S1G3M2	EA	1.000		

REL #2022-01

J1 RF INPUT

W1

A1 VAR GAIN AMP SCHEM 1008812

ATTN

C9 C10 C11 C12 C13

C16

W2

A4 1 WATT AMP SCHEM 1010581

C31 C41 C51 C61 C71 C81

M/C M/C

P6

J2

W3

A5 BIAS CTRL CKT SCHEM 1010902

J1

P2

+16.5V

GND

-5V

A6 C28 QUAD AMP

C4 C1

-5V +16.5V

W4

A7 2 WAY SPLITTER

W5

W6

A8 C28 QUAD AMP

A9 C28 QUAD AMP

C4 C1

-5V +16.5V

W7

W8

A10 SPLITTER

A11 SPLITTER

W9 W10 W11 W12 W13 W14 W15 W16 W17 W18 W19 W20 W21 W22 W23 W24

A12 C28 QUAD AMP

A13 C28 QUAD AMP

A14 C28 QUAD AMP

A15 C28 QUAD AMP

A16 C28 QUAD AMP

A17 C28 QUAD AMP

A18 C28 QUAD AMP

A19 C28 QUAD AMP

C4 C1

-5V +16.5V

A20 COMBINER

W25

RF OUTPUT

S4

S3

RF GAIN

CW

R1 10K

R2 12K

P/O J3

P/O P13 (P12-8)

P/O P7 J1

P/O P1 J1

A3 LINEARIZER/CTRL CKT SCHEM 1007392

(P12-10) (P12-9) TO A22

P/O J1 P1

+15V -15V

S2 S1

P/O J1 7 6 4 8 9 1 5

P/O P7

(+16.5,+16.5,A12-A19) +15V -15V -5V +16.5

FL1

LINE

NEUT

GND

CB1

P3 J1

PS1

LINE

NEUT

+12 +5 GND -12

P1

J2

P4

K1

PS2

LINE

NEUT

GND

PS INHIBIT

+16.5V

+24V

-24V

J1

P8

B1 B2 B3

S5 PWR REMOTE

S6 LOCAL

S7 FAULT RESET

P/O J3 P/O P13

P/O J1 P/O P1

A21

OPERATE/CONTROL OCB

K1

THERMAL FAULT

P.S. INHIBIT

+12V

+5V

-12V

FAULT DET

-5V FAULT

-15V FAULT

+15V FAULT

+16.5V FAULT

AMP FAULT

REMOTE INTLK

(+16.5V PS2)

P2 IEEE-488

P3 RS-232

DISPLAY

J1 P9

A22

REGULATOR/CONTROL BD SCHEMATIC 1009511

+12V IN

OPERATE IN

-5V FAULT OUT

-15V FAULT OUT

+15V

AMP FAULT

REMOTE GAIN ENABLE

ANALOG GAIN SIGNAL

TO K1 +12

-5V OUT

+16.5V

-15V OUT

+15V OUT

+24 IN

-24V IN

A8,A8,A9 FAULT

A12,A13 FAULT

A14,A15 FAULT

A16,A17 FAULT

A18,A19 FAULT

(A8,A9,A8-C28)

(A12,A13-C28)

(A14,A15 -C28)

(A16,A17-C28)

(A18,A19-C28)

RF GAIN CONT (WIPER)

LINEARIZER/CTRL GAIN

LINEARIZER/CTRL DET

J3 P11

INTERLOCK

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIND NO.
		PARTS LIST			

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL
REMOVE ALL BURRS AND SHARP EDGES

	2 PLACE DECIMALS	3 PLACE DECIMALS
ANGULAR DIMENSIONS	±.02°	±.005°
MACHINED SURFACES	125	125
ALL OTHER SURFACES	250	250

50S1G3	
50S1G4A	
USED ON MODEL	

DRAWN G.JACKSON DATE 14 MAY 99
CHKD G.JACKSON DATE 14 MAY 99
MECH J.MAGINN DATE 9/13/99
ELEC F.SCHIRN DATE 17 AUG 99

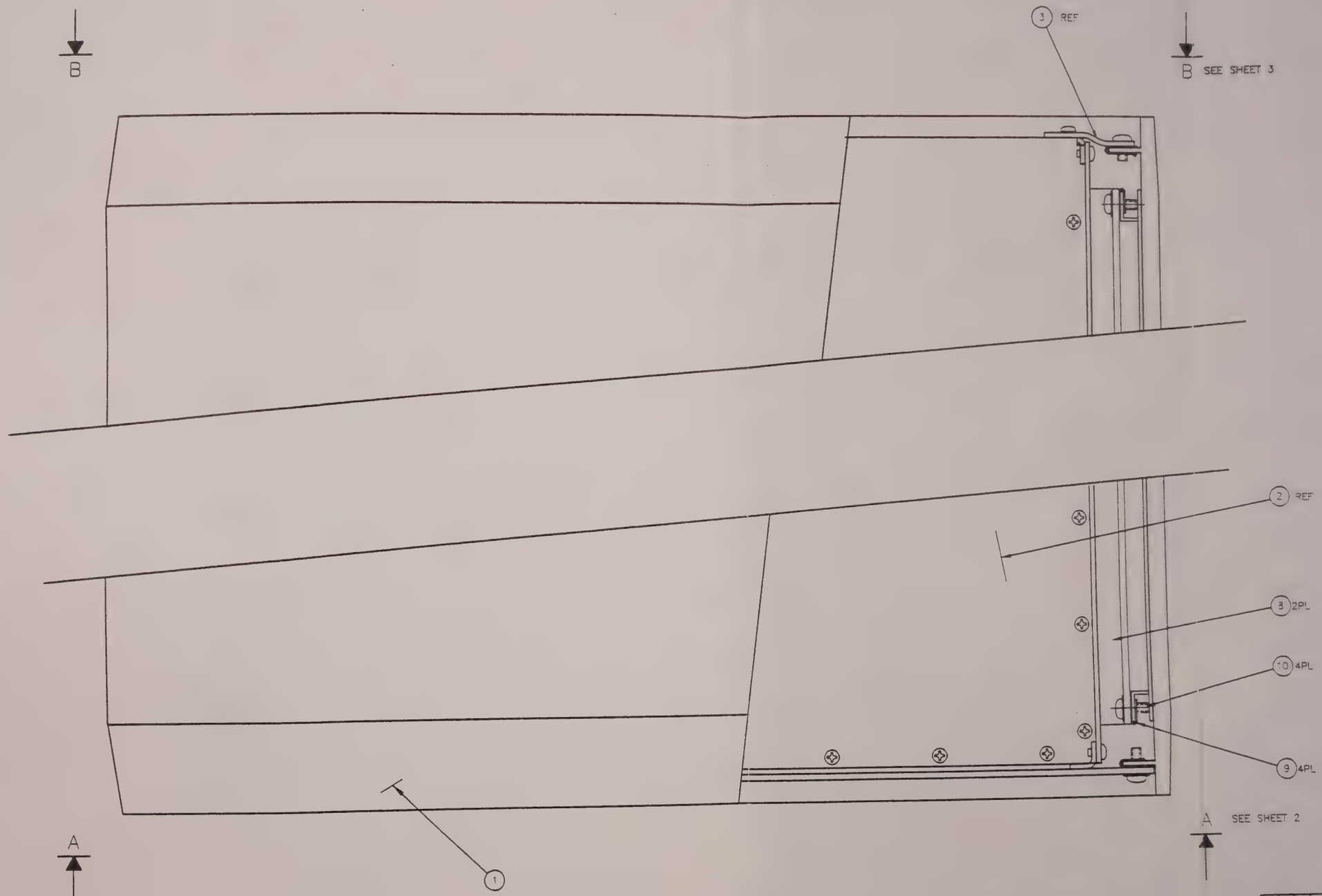
AMPLIFIER RESEARCH

SCHEMATIC, 50S1G4A

DWG. NO. 1010552

SCALE 1/1 SHEET . OF . REV

REL #2031-01



SHT	1	2	3
REV	–	–	–

FOR BOM SEE 1010643-501

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN
		PARTS LIST			

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND MILLIMETERS
ALL THREADS ARE UNIFIED NATIONAL
REMOVE BURRS AND SHARP CORNERS

SIZES	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
OVER 6 TO 24	±.05	±.010
OVER 24	±.25	±.010

ANGULAR DIMENSIONS ±1°

DRAWN G.JACKSON DATE 18 OCT 99
CHKD G.JACKSON DATE 19 OCT 99
MECH DATE
ELEC DATE

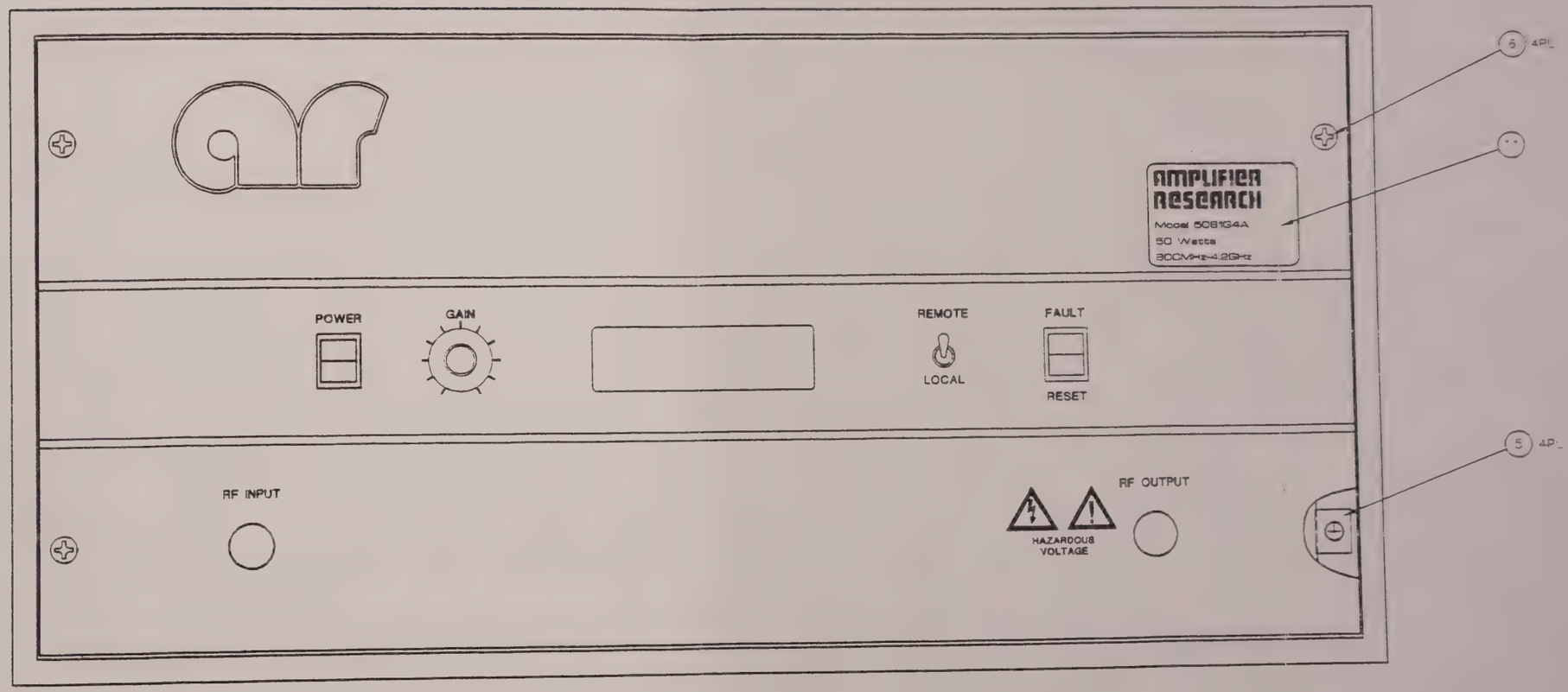
AMPLIFIER RESEARCH

MODEL 60S1G3

DWG. NO. 1010643-501

SCALE 1:1 SHEET 1 OF 3

60S1G3 USED ON MODEL

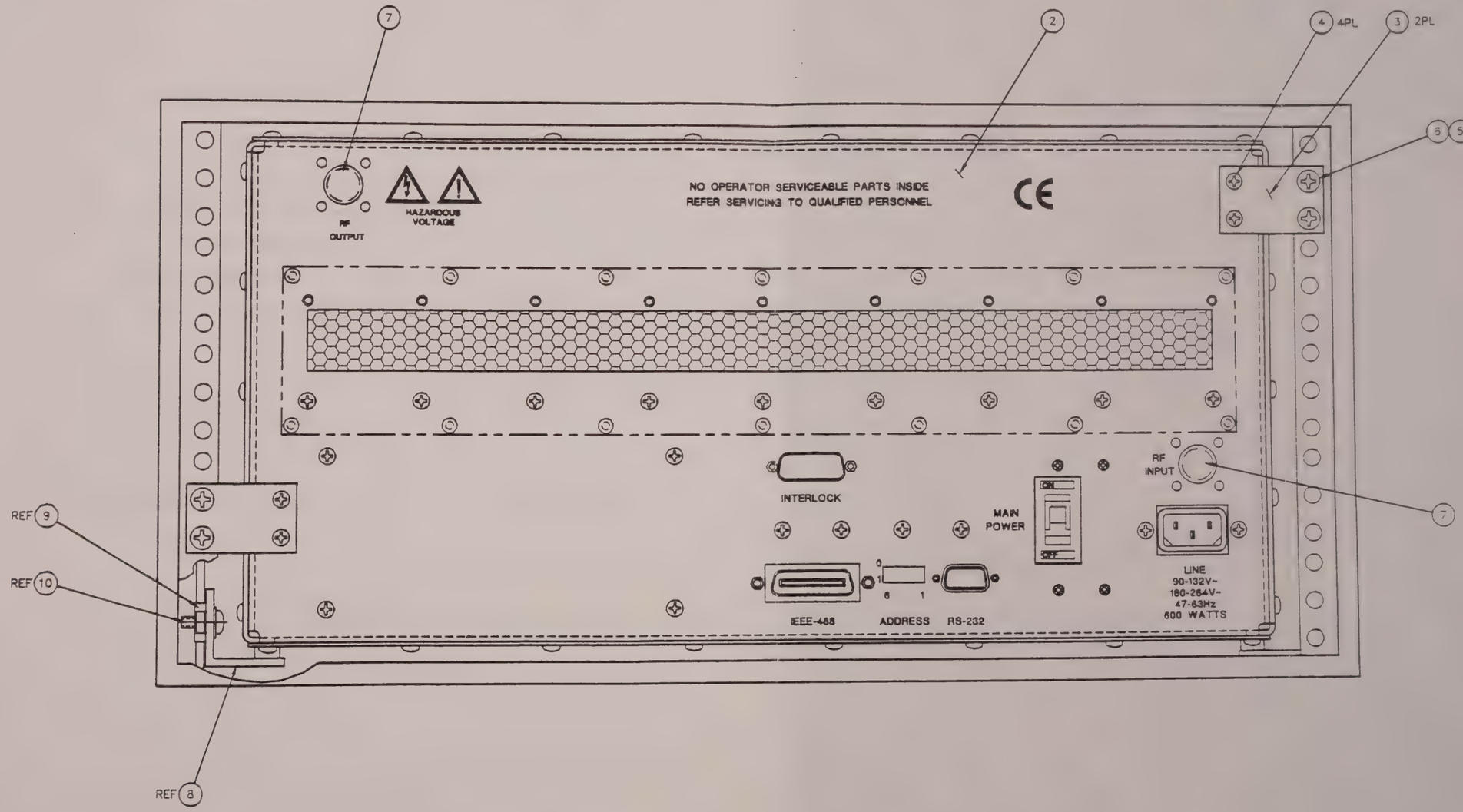


SECTION A-A

DWG. NO. 1010643

SCALE SHEET 2 OF 3 REV

REL #2031-01 | REL | DOC



DWG. NO. 1010643

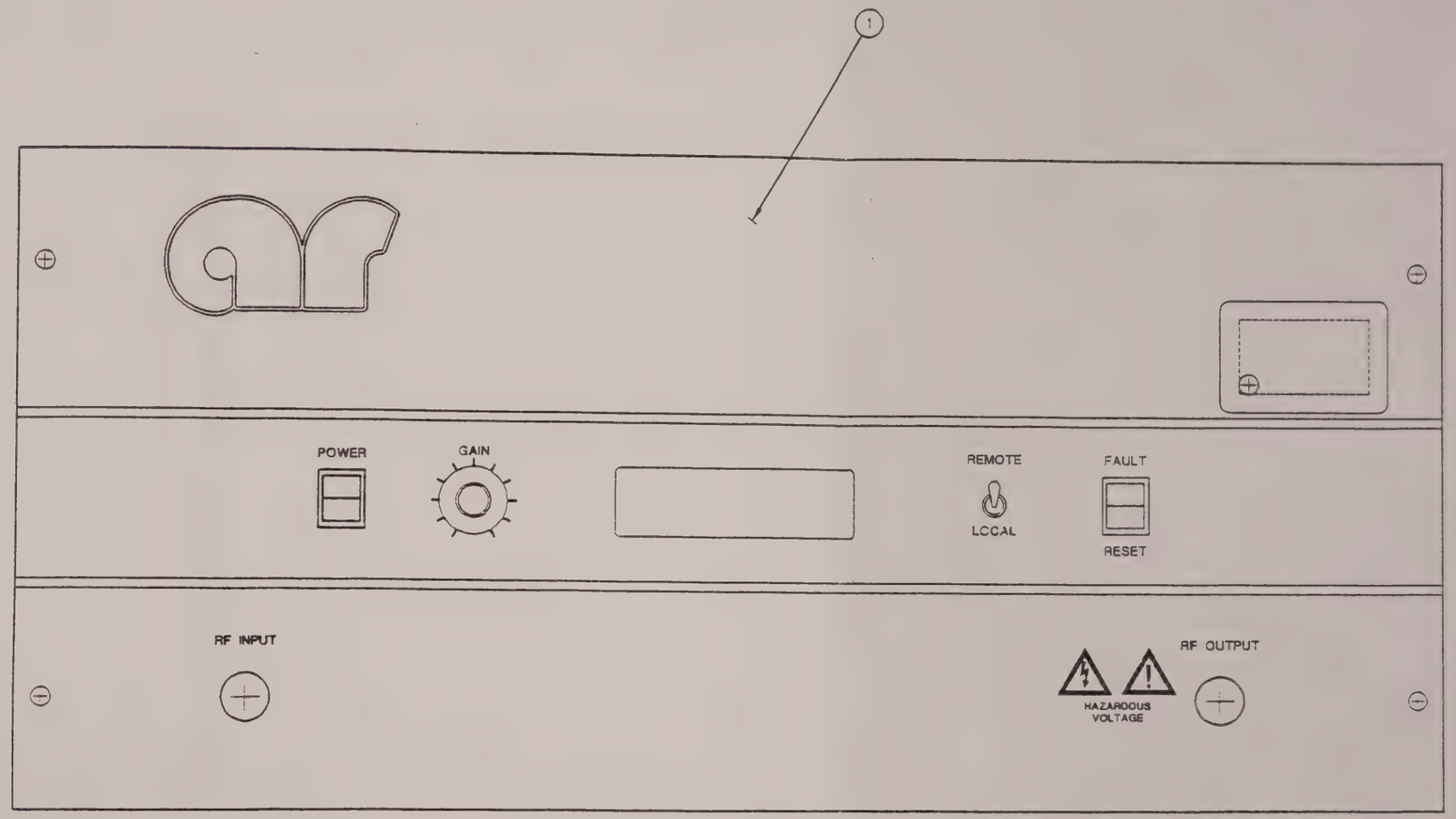
SCALE 1/1 | SHEET 3 OF 3 | REV

AMPLIFIER RESEARCH

08:59:26 06 DEC 2000 *** SINGLE LEVEL BILL OF MATERIAL LISTING *** REPORT: E0056 PAGE: 1

BILL NO: 1010643-501 REV: B U/M: EA DRAWING NO: ARC-D\1010643
MODEL 60S1G3,1.0-3.0GHz,60 WATTS

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1010643	-	ASSY DWG,MODEL 60S1G3	EA	REF	ARC-D\1010643	
0020	1010552	B	SCHEM DIAG,50S1G4A	EA	REF	ARC-D\1010552	
0030	1010672-501		MANUAL,MODEL 60SIG3	EA	4.000		
5000	1001576-314	T	CABINET,INST CASE,PERF BOT PNL,8.75 H,19.94 D	EA	1.000	ARC-B\1001576	1
5010	1010882-501	-	FINAL ASSY,60S1G3	EA	1.000	ARC-D\1010882	2
5020	1008771-101	-	BRKT,SHIPPING	EA	2.000	ARC-D\1008771	3
5030	11137		SCREW,MACH,PAN HD,CROSS-REC,S/ZN,6-32X.31,TYPE SW	EA	4.000		4
5040	14043		FASTENER,"U" TYPE,10B SCREW,PNL RANGE .125-.160	EA	8.000	ECO\C14810-102	5
5050	94027		SCREW,PNL,DECORATIVE,WITH NYLON WASH	EA	8.000	OPM\HW-1	6
5060	69111		PLUG,HOLE,METAL,5/8"DIA HOLE,13/16"O/A DIA	EA	2.000	HHS\654	7
5070	1008772-101	-	ANGLE,SUPPORT,SIDE	EA	2.000	ARC-B\1008772	8
5080	14000		FASTENER,TINNERMAN,C8121-101-4	EA	8.000	ECO\C8121-10-4	9
5090	11130		SCREW,MACH,HEX HD SLTD,S/ZN PLTG,#10 X.50,TYPE B	EA	4.000		10
5100	1007226-101-F1-M250	DJ	PL,MODEL NO,60S1G3	EA	1.000	ARC-A\1007226	11
5110	66147		PWR CORD,3 COND,18AWG,UNIV DTCH	EA	1.000	PAE\C3120-008-BL	



SHEET	1	2	3	4
REV	–	–	–	–

FOR BOM SEE 1010882-501

QTY REQD.	ITEM	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SCREW, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.05	±.015
ANGULAR DIMENSIONS	±1°	

DRAWN G.JACKSON DATE 19 OCT 99
CHKD G.JACKSON DATE 19 OCT 99
MECH DATE
ELEC DATE

AMPLIFIER RESEARCH

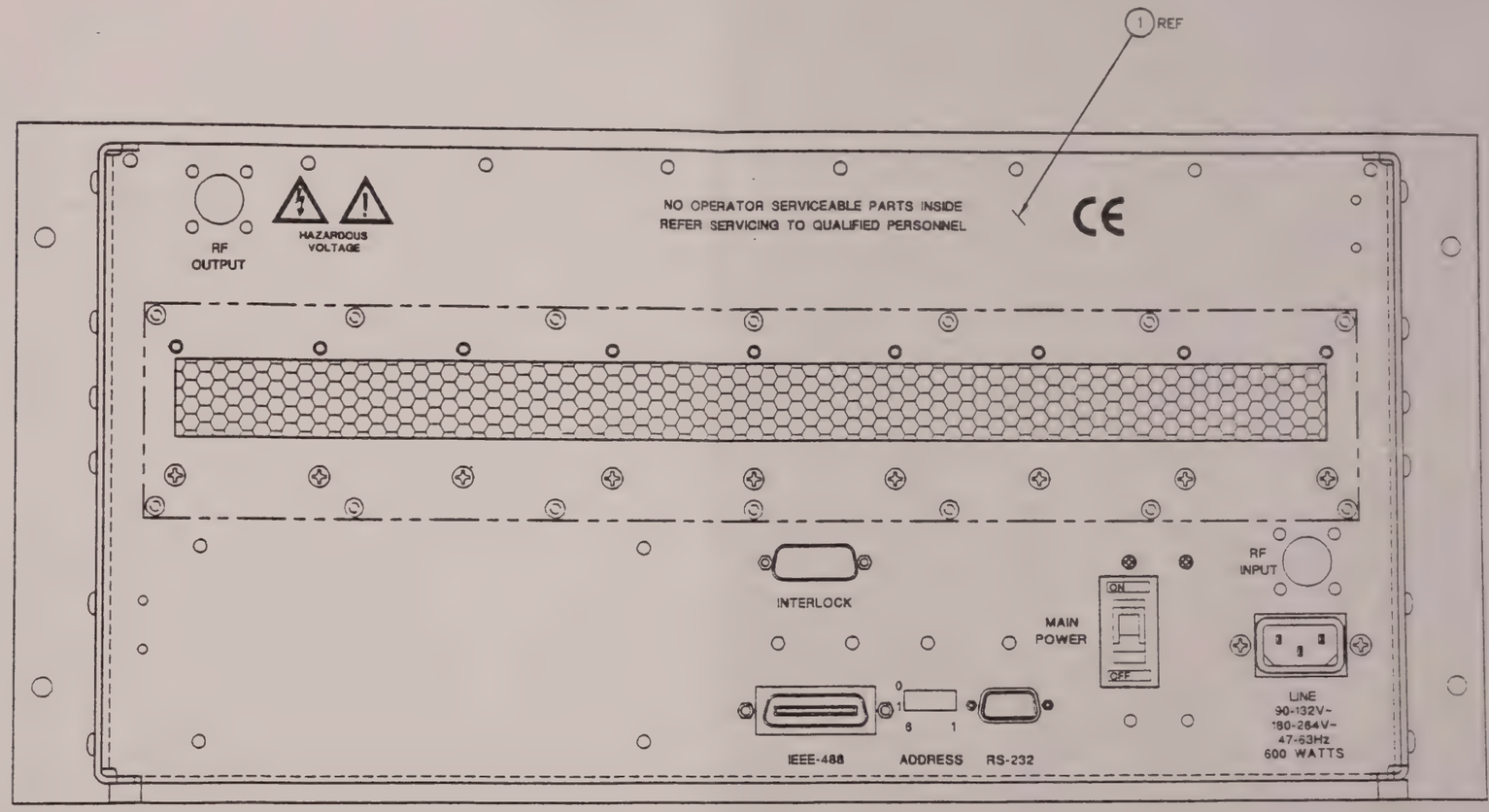
FINAL ASSY
60S1G3

DWG. NO.
1010882

SCALE
SHEET 1 OF 4
REV SEE REV BLK

60S1G3
USED ON MODEL

REL #2031-01

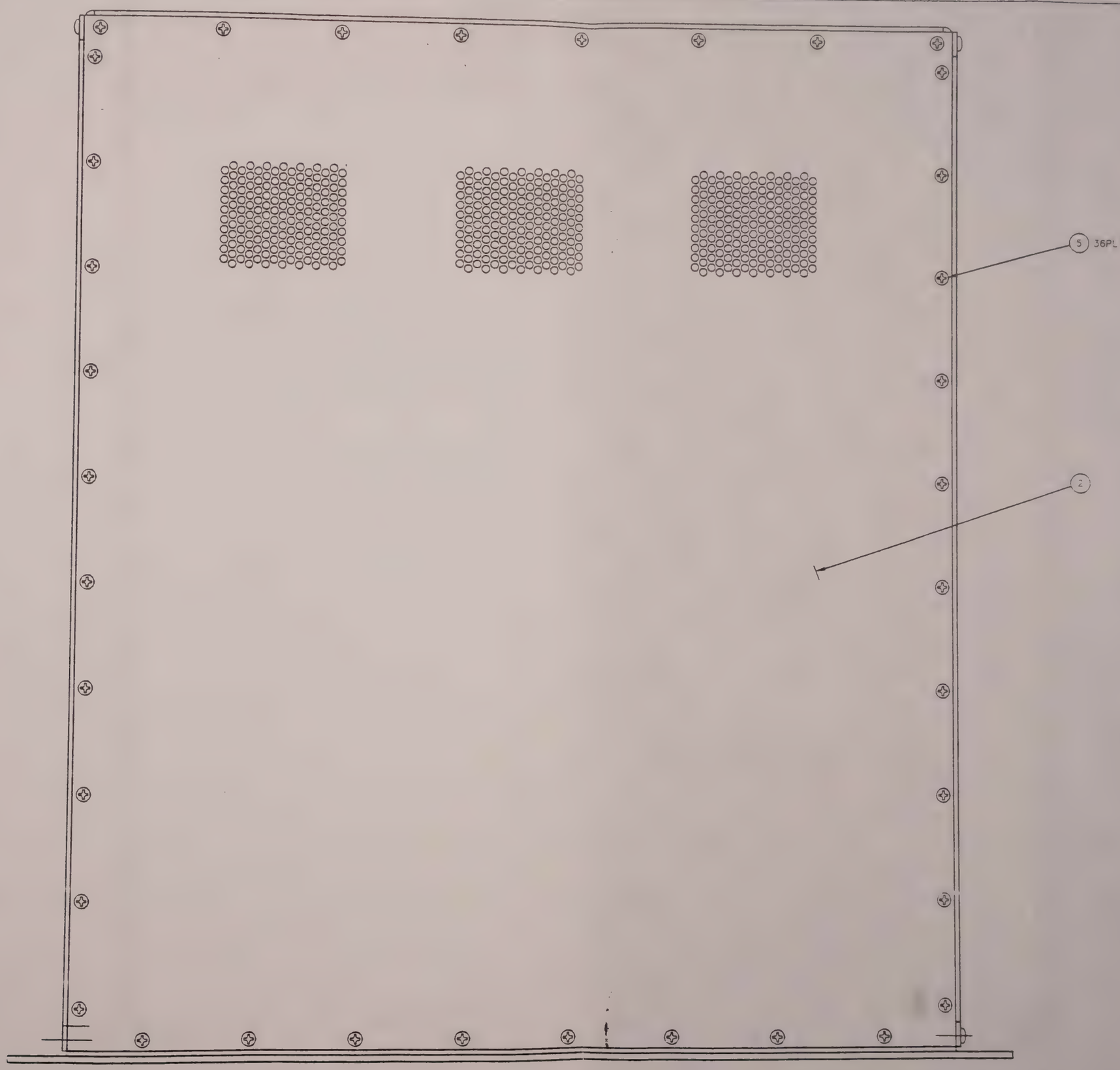


DWG. NO. 1010882

SCALE

SHEET 2 OF 4

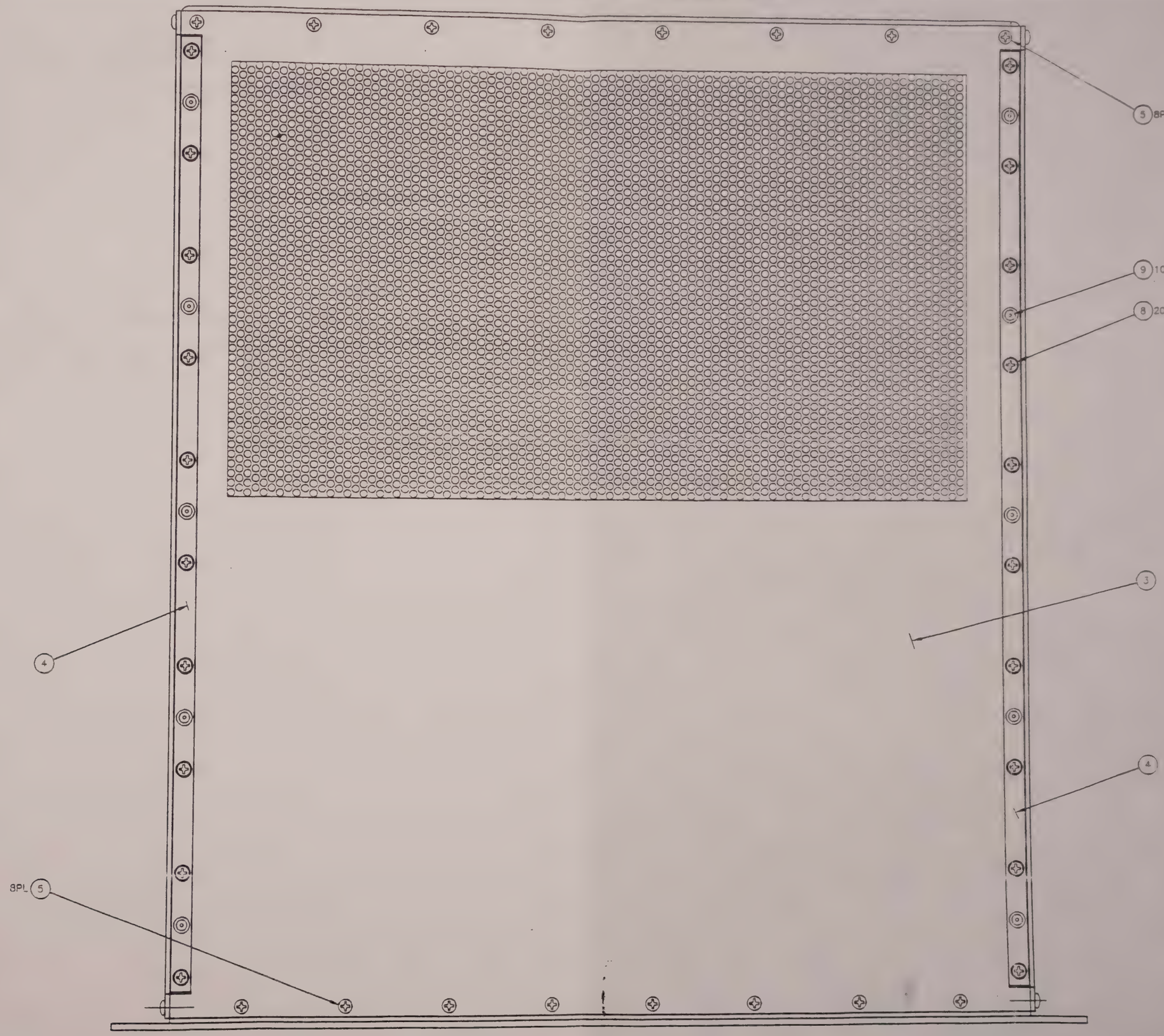
REV



DWG. NO.	
	1010882
SCALE	SHEET 3 OF 4

ECN	DATE	BY
REL	18OCT99	

REL #2031-01



DWG. NO.
1010882

SCALE 1/1 SHEET 1 OF 1 REV SEE SHT

AMPLIFIER RESEARCH

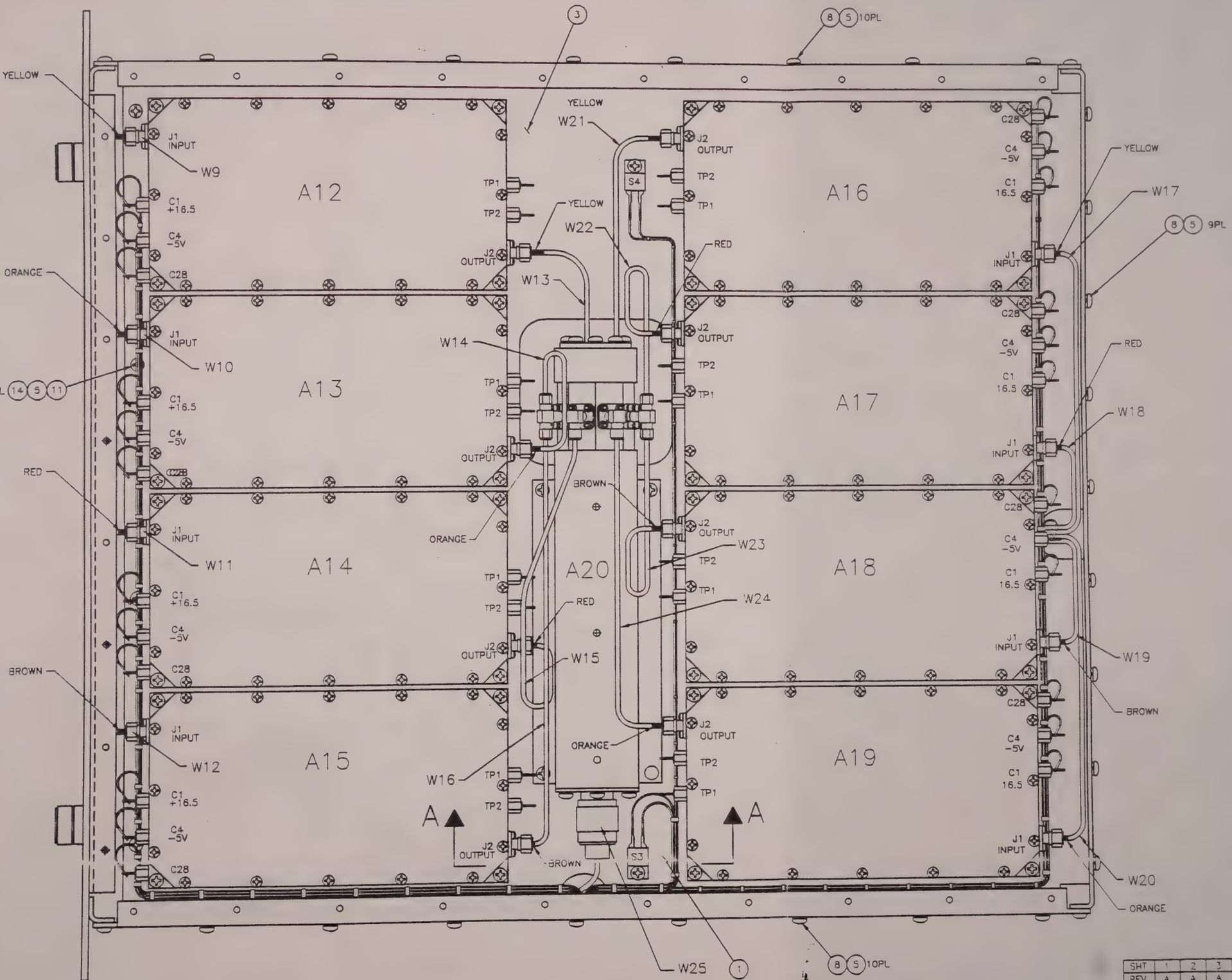
08:59:27 06 DEC 2000 *** SINGLE LEVEL BILL OF MATERIAL LISTING *** REPORT: E0056 PAGE: 1

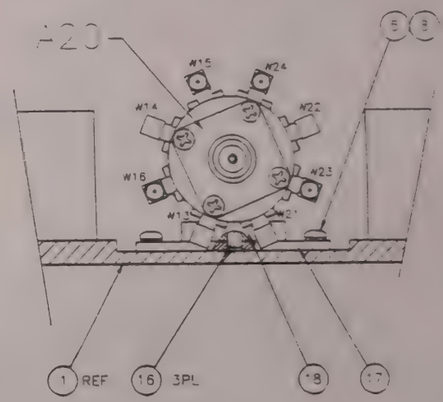
BILL NO: 1010882-501 REV: - U/M: EA DRAWING NO: ARC-D\1010882
FINAL ASSY,60S1G3

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1010882	-	ASSY DWG,FINAL,60S1G3	EA	REF	ARC-D\1010882	
5000	1010883-501	B	AMP ASSY	EA	1.000	ARC-D\1010883	1
5010	1008612-101	-	COVER,TOP	EA	1.000	ARC-D\1008612	2
5020	1008621-101	-	COVER,BOTTOM	EA	1.000	ARC-D\1008621	3
5030	1008773-101	A	GLIDE	EA	2.000	ARC-C\1008773	4
5040	11137		SCREW,MACH,PAN HD,CROSS-REC,S/ZN,6-32X.31,TYPE SW	EA	52.000		5
5065	11018		SCREW,MACH,PAN HD,CROSS-REC,ZN,6-32 X .38,TYPE SW	EA	20.000		8
5070	69120		RIVET,GRIP-TITE,A,1/8"DIA,1/8-1/4"MAT'L THK	EA	10.000	GRA\5X520	9

REL #2031-01

SYM	DATE
REL	19OCT99





SECTION A–A

FOR BOM SEE 1010883-501

SHT	1	2	3
REV	A	A	A

ITEM QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MAT
	PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL VIEWS ARE 3RD ANGLE PROJECTION
SERIES, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.010
OVER 6 TO 24	±.03	±.010
OVER 24	±.05	±.010

ANGULAR DIMENSIONS ±1°

DRAWN G.JACKSON DATE 18 OCT 99
CHKD G.JACKSON DATE 18 OCT 99
MECH J.MAGINN DATE 10/27/99
ELEC F.SCHIRK DATE 25 OCT 99

AMPLIFIER RESEARCH

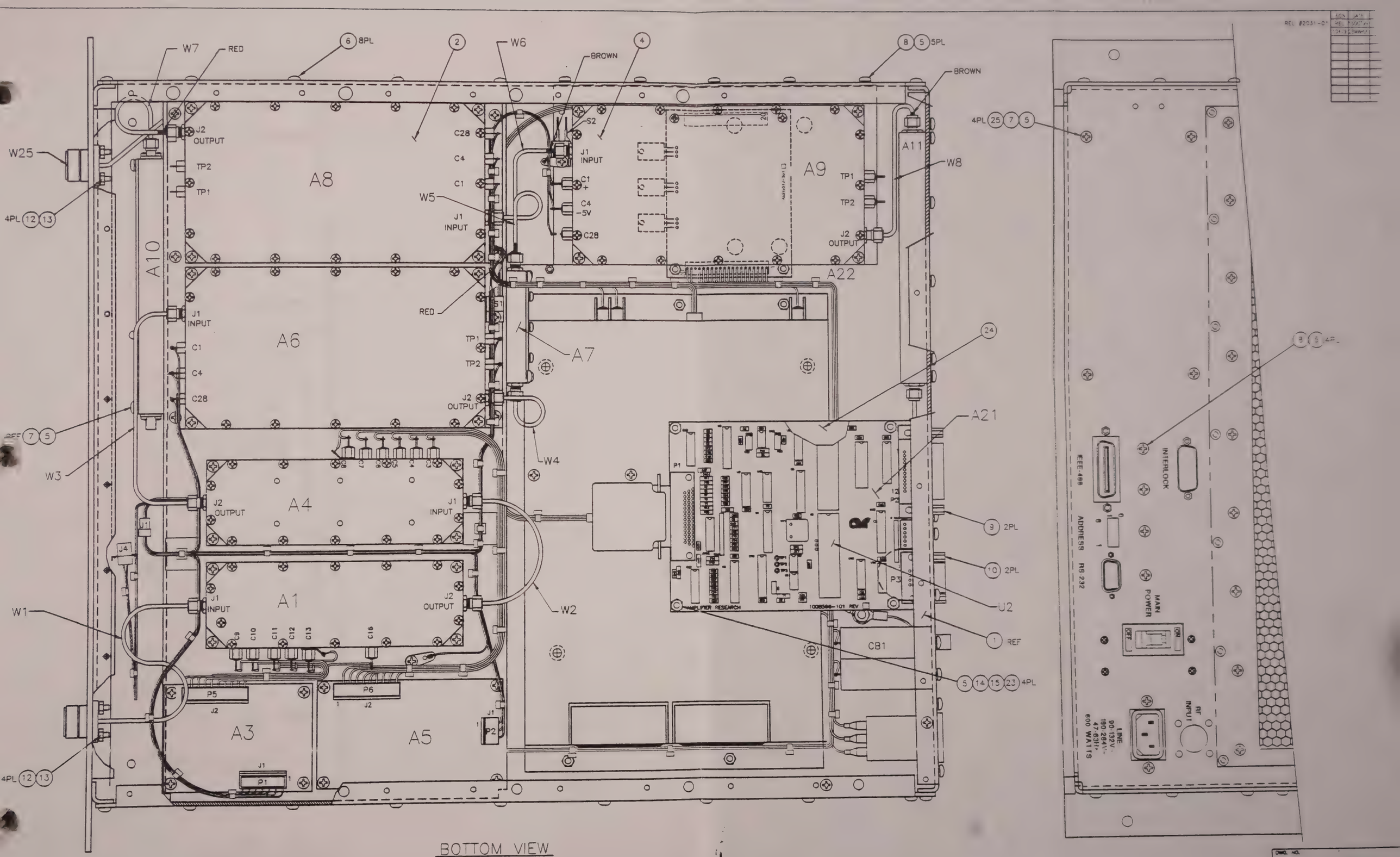
AMP ASSY

DWG. NO. 1010883

REV SEE REV TBL

SCALE 1/1 SHEET 1 OF 3

9051G3
USED ON MODEL



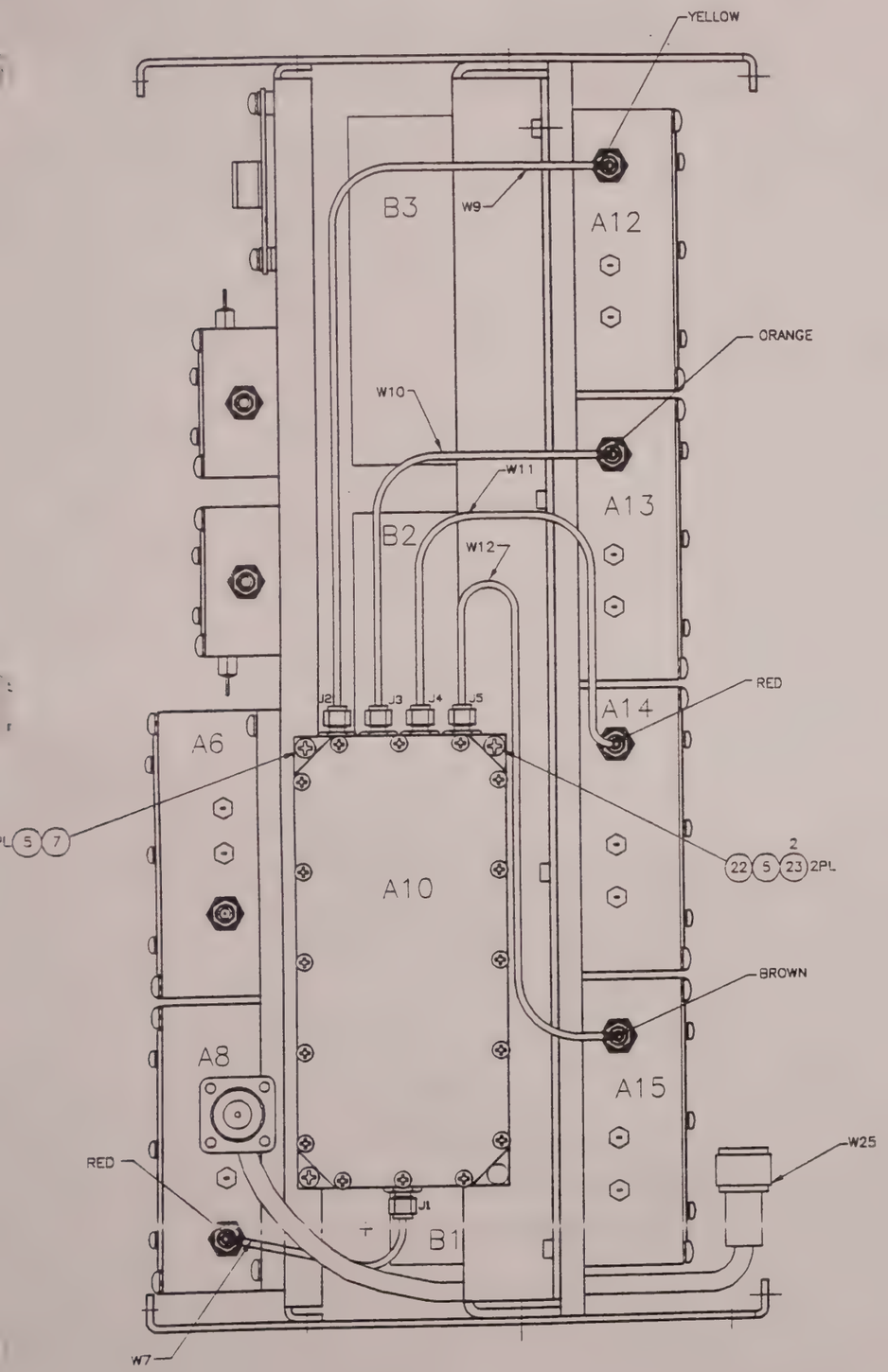
BOTTOM VIEW

DWG. NO. 1010883

SCALE 1/1 SHEET 2 OF 3

REL #2031-01

ECN	DATE	-
PE	ADDITIONS	-
CATS	REMARKS	-



FRONT VIEW
CONTROL PNL REMOVED

AMP ASSY PROCEDURE

1.0 REMOVE CONTROL PANEL FROM THE POWER SUPPLY ASSEMBLY.

2.0 REMOVE RIGHT SIDE PANEL, P/N 1008607-101 FROM THE POWER SUPPLY ASSEMBLY.

3.0 INSTALL THE FINAL RF ASSY HEATSINK ,P/N 1008627, (ITEM 3) INTO POWER SUPPLY, ATTACH WITH SCREWS TO REAR PANEL P/N 1010562-301 (ITEM 1) AND LEFT SIDE PANEL, P/N 1010559-101

4.0 ADD VIOLET JUMPER BETWEEN A12-C4 AND A19-C4 BEFORE TIE WRAPPING WIRING HARNESS.

5.0 INSTALL THE RF LOW LOW LEVEL ASSY. ATTACH WITH SEVERAL SCREWS THRU LEFT SIDE OF POWER SUPPLY.

6.0 PUT THE OUTPUT CABLE (W25) IN PLACE IN THE FINAL HEAT SINK AND POWER SUPPLY CHASSIS.

7.0 INSTALL THE RIGHT SIDE OF THE POWER SUPPLY.

8.0 INSTALL A10 AND A11, FOUR WAY SPLITTERS.

9.0 INSTALL COAX CABLE ASSEMBLIES W9,W10,W11,W12,W18,W17,W19 AND W20. FORM BENDS CAREFULLY.

10.0 INSTALL W7 FROM A8, QUAD AMP, TO A10, SPLITTER.

11.0 INSTALL CABLE W8 TO INPUT OF A11, 4 WAY SPLITTER. POSITION OTHER OTHER END FOR EASY ATTACHMENT TO A9.

12.0 INSTALL A9, DRIVER ASSY. ATTACH TO SIDE WALL. ATTACH COAX, W8, TO OUTPUT OF A9.

13.0 INSTALL COAX CABLES W4,W5 AND W6.

14.0 INSTALL THE A21, OPERATE CONTROL BOARD.

15.0 INSTALL W1 INTO CONTROL PANEL. INSTALL W25 TO CONTROL PANEL WHILE POSITIONING THE CONTROL PANEL INTO PLACE. SECURE CONTROL PANEL.

16.0 INSTALL REMAINING DRIVER CABLES W2 AND W3

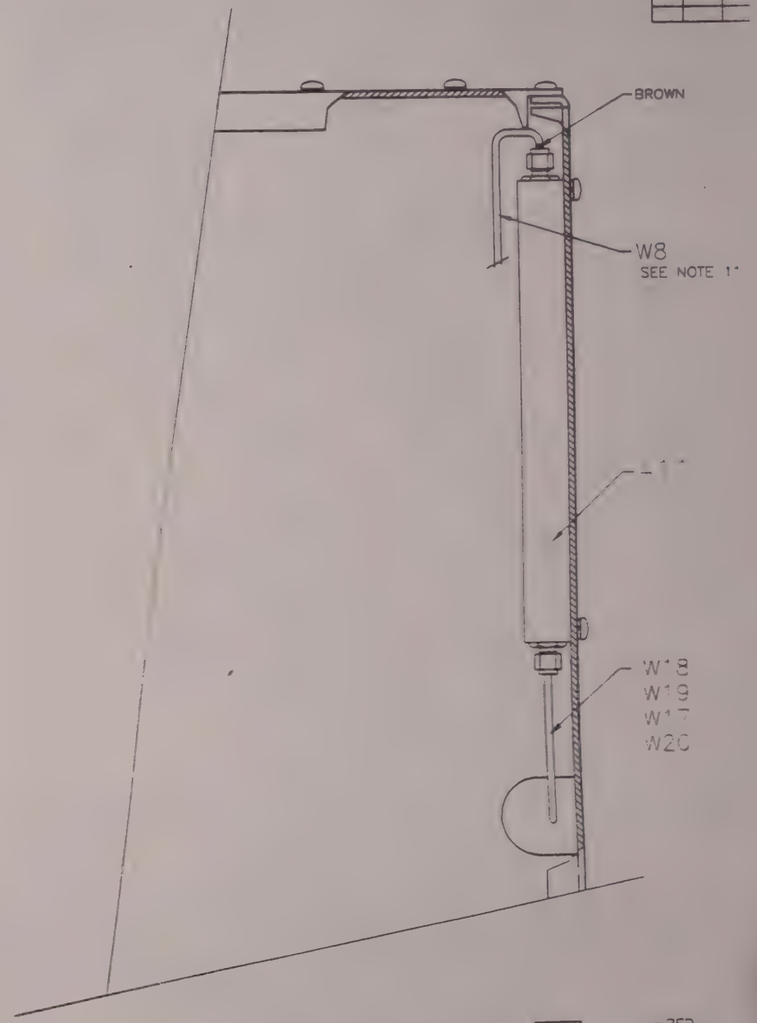
17.0 INSTALL SPACER, ITEM 15, AND MOUNTING BRACKET, ITEM 17 TO THE EIGHT WAY COMBINER (A20).

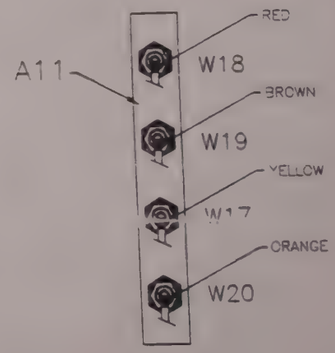
18.0 SET THE EIGHT WAY COMBINER (A20) IN THE APPROX FINAL INSTALLATION POSITION.

19.0 CAREFULLY PREFORM THE COAX CABLES WHICH ATTACH TO THE 8 WAY COMBINER (A20) FROM THE OUTPUTS OF THE QUAD AMPS.

20.0 TIGHTEN COAX CABLES W13 AND W21 TO THE EIGHT WAY COMBINER (A20) BEFORE INSTALLING THE COMBINER

21.0 ATTACH THE EIGHT WAY COMBINER (A20) TO THE HEAT SINK FINAL. TIGHTEN ALL COAX CABLES TO THE EIGHT WAY COMBINER AND THE OUTPUTS OF THE AMPLIFIER.





DWG. NO.	1010883	
SCALE	SHEET	REV
1/1		SEE SH

BILL NO: 1010883-501 REV: B U/M: EA DRAWING NO: ARC-D\1010883
AMP ASSY

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1010883	A	ASSY DWG,AMP	EA	REF	ARC-D\1010883	
0020	1010556	A	WIRE LIST,PS ASSY	EA	REF	ARC-A\1010556	
0030	1010567	C	WIRE LIST,LO LEVEL	EA	REF	ARC-A\1010567	
0090	1010072-501	A	PWB ASSY,4 WAY SPLITTER #3	EA	2.000	ARC-D\1010072	A10 ,A11
0100	1007409-501	C	COMBINER ASSY,8 WAY	EA	1.000	ARC-C\1007409	A20
0110	1008595-501	C	PWB ASSY,OPERATE/CONTROL(OCB)	EA	1.000	ARC-C\1008595	A21
0115	1010884-501	-	ASSY,CONTROLLER,60S1G3	EA	1.000		U2
0120	1011131-501	-	CABLE KIT,AMP ASSY,50S1G4,60S1G3	EA	1.000		
5000	1010554-501	B	PS ASSY	EA	1.000	ARC-D\1010554	1
5010	1011265-501	-	RF,LO LEVEL ASSY	EA	1.000	ARC-D\1010564	2
5020	1010885-501	-	RF ASSY,FINAL	EA	1.000	ARC-D\1010885	3
5025	1011266-501	-	AUX,RF LOW LEVEL ASSY	EA	1.000	ARC-B\1010571	4
5030	12048		WASH,LOCK,SPLIT,S/S,#6	EA	54.000	\MS35338-136	5
5050	11018		SCREW,MACH,PAN HD,CROSS-REC,ZN,6-32 X .38,TYPE SW	EA	8.000		6
5060	11023		SCREW,MACH,PAN HD,CROSS-REC,S/S,6-32 X 1	EA	10.000	\MS51957-34	7
5070	11016		SCREW,MACH,PAN HD,CROSS-REC,S/S,6-32 X .38	EA	43.000	\MS51957-28	8
5080	69375	-	SCREWLOCK KIT,METRIC,IEEE-488	EA	1.000	AMP\554808-1	9
5090	69262		SCREWLOCK KIT,F,USE WITH METAL SHELL"D"CONN	EA	1.000	AMP\207952-1	10
5100	11021		SCREW,MACH,PAN HD,CROSS-REC,S/S,6-32 X .62	EA	4.000	\MS51957-31	11
5110	12047		WASH,LOCK,SPLIT,S/S,#4	EA	8.000	\MS35338-135	12
5120	13003		NUT,HEX,S/S,4-40,.187AF	EA	8.000		13
5130	12011		WASH,FLAT,S/S,#6,.312 OD X .156 ID X .035 THK	EA	8.000	\MS15795-805	14
5140	12024		WASH,FLAT,B/ZN PLTG,.312 OD X .164 ID X .125 THK	EA	4.000	\S785-M01-F21-.164	15
5150	11065		SCREW,MACH,FLT HD,100 DEG,CROSS-REC,S/S,6-32 X .50	EA	3.000	\MS24693-C28	16

BILL NO: 1010883-501 REV: B U/M: EA DRAWING NO: ARC-D\1010883
AMP ASSY

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
5160	1008628-101	-	BRKT,COMBINER,8 WAY	EA	1.000	ARC-B\1008628	17
5170	1008768-101	-	PLATE,ADAPTER,8 WAY	EA	1.000	ARC-B\1008768	18
5190	12010		WASH,FLAT,S/S,#4,.250 OD X .125 ID X .022 THK	EA	2.000	\MS15795-803	20
5200	11010		SCREW,MACH,PAN HD,CROSS-REC,S/S,4-40 X .25	EA	2.000	\MS51957-13	21
5210	11024		SCREW,MACH,PAN HD,CROSS-REC,S/S,6-32 X 1.25	EA	2.000	\MS51957-35	22
5220	14007		SPACER,HEX,NON-THD,.250 HEX X .250 LG X 6 ID	EA	2.000	HHS\2300	23
5230	1010563-301	A	BRKT,SUPPORT	EA	1.000	ARC-C\1010563	24
5240	13004		NUT,HEX,S/S,6-32,.250AF	EA	4.000		25

BILL NO: 1008975-501 REV: - U/M: EA DRAWING NO: ARC-B\1008975
CABLE ASSY,COAX,SEMI-RIGID,SMA,SMA,5.5"

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1008975	-	ASSY DWG,CABLE ASSY,COAX SEMI RIGID	EA	REF	ARC-B\1008975	
5000	41162		CONN,SMA ST PLUG,SEMI-RIGID COAX	EA	2.000	AEP\9301-7063-009	1
5010	66208	-	WIRE,COAX,SEMI-RIGID,.141 AL-TP/M17 50 OHM	IN	5.500	EZF\810015	2

BILL NO: 1008975-502 REV: - U/M: EA DRAWING NO: ARC-B\1008975
CABLE ASSY,COAX,SEMI-RIGID,SMA,SMA,6.0"

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
5000	41162		CONN,SMA ST PLUG,SEMI-RIGID COAX	EA	2.000	AEP\9301-7063-009	1
5010	66208	-	WIRE,COAX,SEMI-RIGID,.141 AL-TP/M17 50 OHM	IN	6.000	EZF\810015	2

AMPLIFIER RESEARCH

08:59:29 06 DEC 2000 *** SINGLE LEVEL BILL OF MATERIAL LISTING *** REPORT: E0056 PAGE: 1

BILL NO: 1008976-501 REV: - U/M: EA DRAWING NO: ARC-B\1008976
CABLE ASSY,COAX,SEMI-RIGID,SMA,SMA,3.5"

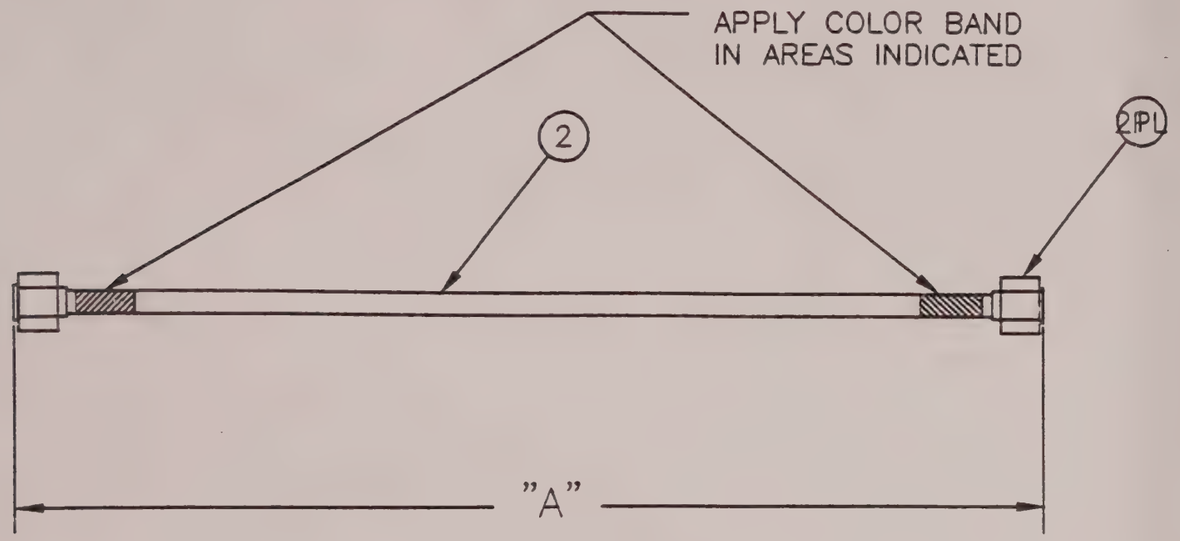
SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1008976	-	ASSY DWG,CABLE ASSY,COAX SEMI RIGID	EA	REF	ARC-B\1008976	
5000	41140		CONN,SMA PLUG,SEMI-RIGID COAX	EA	2.000	EFJ\142-0693-051	1
5010	66206		WIRE,COAX,SEMI-RIGID,ALUM,50 OHM	EA	3.200	EZF\EZ-86-AL-TP	2

BILL NO: 1008976-502 REV: - U/M: EA DRAWING NO: ARC-B\1008976
CABLE ASSY,COAX,SEMI-RIGID,SMA,SMA,4.0"

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
5000	41140		CONN,SMA PLUG,SEMI-RIGID COAX	EA	2.000	EFJ\142-0693-051	1
5010	66206		WIRE,COAX,SEMI-RIGID,ALUM,50 OHM	EA	3.700	EZF\EZ-86-AL-TP	2

ECN	DATE	REV
REL	21NOV97	–

REL No 1154-07



DASH NO.	DIM A	COLOR	REV	FOR BOM SEE
–501	8.00	BROWN	–	1008781–501
–502	9.00	RED	–	1008781–502
–503	10.00	ORANGE	–	1008781–503
–504	11.00	YELLOW	–	1008781–504

NOTES:

1.0 "A" DIM IS CRITICAL WITHIN ±0.032.

2.0 APPLY COLOR BAND WITH A PAINT PEN.

3.0 CLEAN COAX BEFORE CONNECTOR INSTALLATION.

QTY. REQD.	ITEM	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED DO NOT SCALE DRAWING DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2 REMOVE ALL BURRS AND SHARP EDGES			
BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS	
UP TO 6	±.02	±.005	
ABOVE 6 TO 24	±.03	±.010	
ABOVE 24	±.06	±.015	
ANGULAR DIMENSIONS 1/2°			

50S1G4

USED ON MODEL

DRAWN G.JACKSON DATE 29 APR 97

CHKD G.JACKSON DATE 29 APR 97

MECH DATE 11/21/97

ELEC DATE 20NOV97

AMPLIFIER RESEARCH

CABLE ASSY
COAX, SEMI RIGID

DWG. NO. 1008781–XXX

SCALE 1/1 | SHEET 1 OF 1 | REV. –

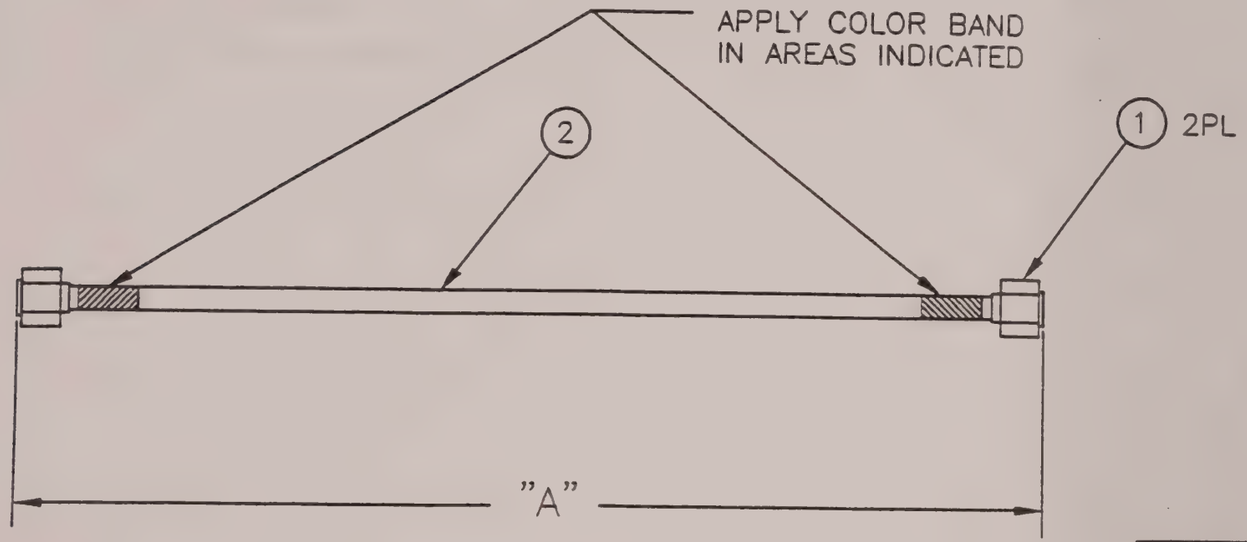
AMPLIFIER RESEARCH

08:59:29 06 DEC 2000 *** SINGLE LEVEL BILL OF MATERIAL LISTING *** REPORT: E0056 PAGE: 1

BILL NO: 1008781-501 REV: - U/M: EA DRAWING NO: ARC-B\1008781
CABLE ASSY,COAX,SEMI-RIGID

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1008781	-	ASSY DWG,CABLE ASSY	EA	REF	ARC-B\1008781	
5000	41162		CONN,SMA ST PLUG,SEMI-RIGID COAX	EA	2.000	AEP\9301-7063-009	1
5010	66208	-	WIRE,COAX,SEMI-RIGID,.141 AL-TP/M17 50 OHM	IN	A/R	EZF\810015	2

REL NO 1154-07	ECN	DATE	REV
	REL	21NOV97	–



DASH NO.	DIM A	COLOR	REV	FOR BOM SEE
-501	10.00	BROWN	–	1008782-501
-502	9.00	RED	–	1008782-502
-503	8.00	ORANGE	–	1008782-503
-504	7.00	YELLOW	–	1008782-504

NOTES:

1.0 "A" DIM IS CRITICAL WITHIN ±0.032.

2.0 APPLY COLOR BAND WITH A PAINT PEN.

3.0 CLEAN COAX BEFORE CONNECTOR INSTALLATION.

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015
ANGULAR DIMENSIONS 1/2°		

50S1G4
USED ON MODEL

DRAWN G.JACKSON DATE 29 APR 97
CHKD G.JACKSON DATE 29 APR 97
MECH J Maguire DATE 5/2/97
ELEC F. Schink DATE 1 may 97

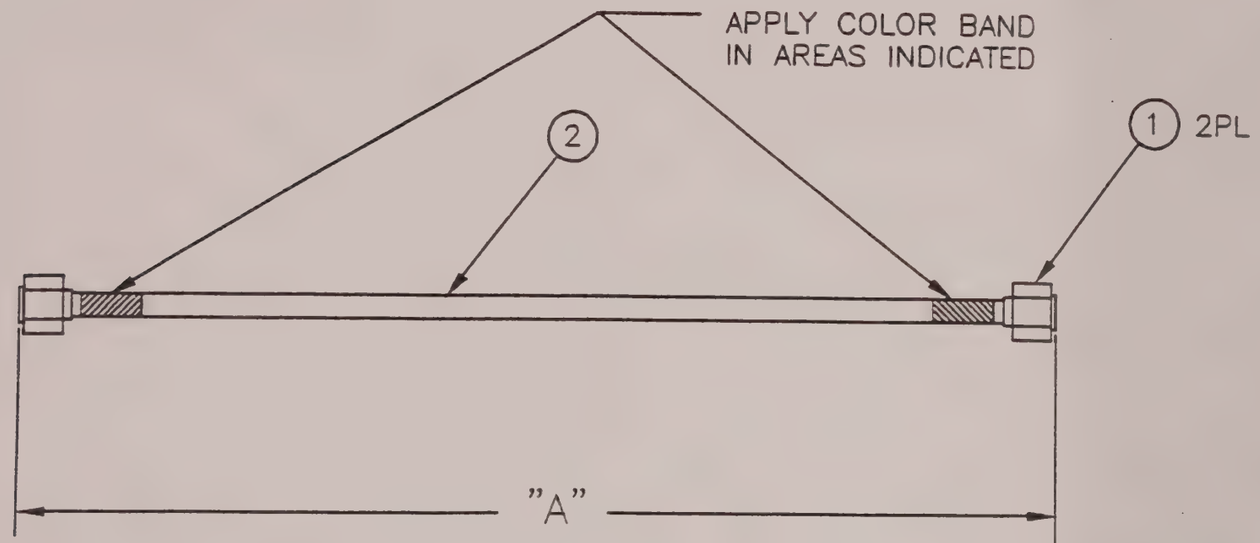
AMPLIFIER RESEARCH

CABLE ASSY
COAX,SEMI RIGID

DWG. NO. 1008782-XXX

SCALE 1/1 | SHEET 1 OF 1 | REV. —

ECN	DATE	REV
REL NO 1154-07	REL	21NOV97	–



DASH NO.	DIM A	COLOR	REV	FOR BOM SEE
–501	10.00	BROWN	–	1008782–501
–502	9.00	RED	–	1008782–502
–503	8.00	ORANGE	–	1008782–503
–504	7.00	YELLOW	–	1008782–504

NOTES:

1.0 "A" DIM IS CRITICAL WITHIN ±0.032.

2.0 APPLY COLOR BAND WITH A PAINT PEN.

3.0 CLEAN COAX BEFORE CONNECTOR INSTALLATION.

ITEM	PART NO.	DESCRIPTION	MARK	FIN	MATL
QTY. REQD.	PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015

ANGULAR DIMENSIONS ±2°

50S1G4
USED ON MODEL

DRAWN G.JACKSON DATE 29 APR 97
CHKD G.JACKSON DATE 29 APR 97
MECH J Magun DATE 5/2/97
ELEC F. Schink DATE 1 May 97

AMPLIFIER RESEARCH

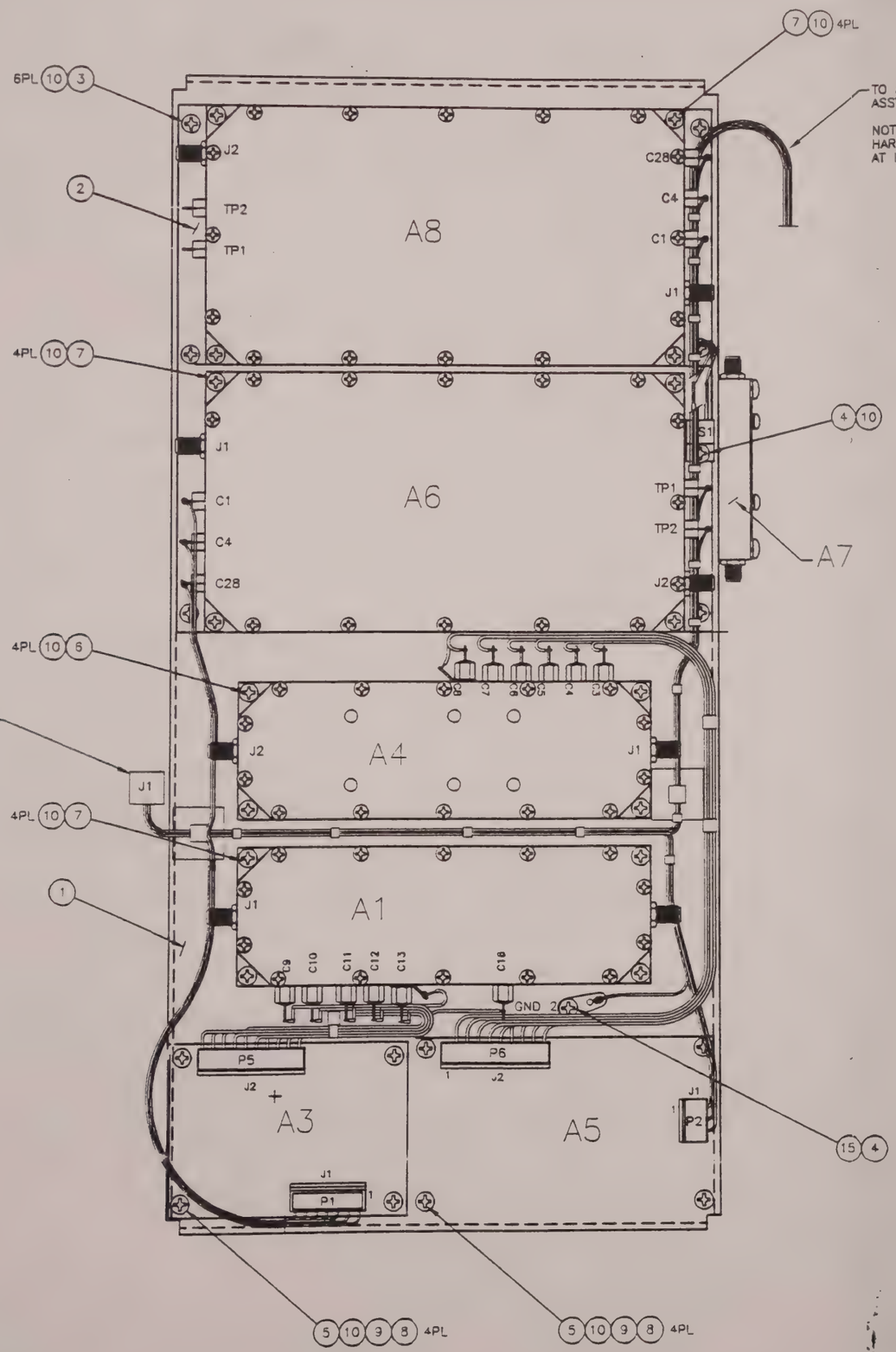
CABLE ASSY
COAX, SEMI RIGID

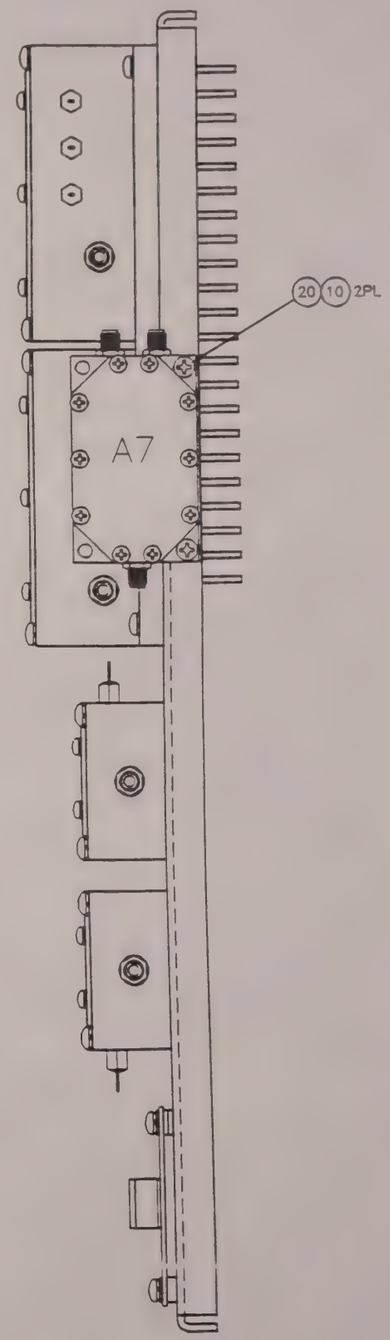
DWG. NO. 1008782–XXX

SCALE 1/1 | SHEET 1 OF 1 | REV. —

BILL NO: 1008782-501 REV: - U/M: EA DRAWING NO: ARC-B\1008782
CABLE ASSY,COAX,SEMI-RIGID

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1008782	-	ASSY DWG,CABLE ASSY	EA	REF	ARC-B\1008782	
5000	41162		CONN,SMA ST PLUG,SEMI-RIGID COAX	EA	2.000	AEP\9301-7063-009	1
5010	66208	-	WIRE,COAX,SEMI-RIGID,.141 AL-TP/M17 50 OHM	IN	A/R	EZF\810015	2





FOR BOM SEE 1010564-501

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL "-" GRADE ARE JUSTIFIED NATIONAL SCHOOL CLASS 7
REMOVE ALL BURRS AND SHARP CORNERS

	2 PLACE DECIMALS	3 PLACE DECIMALS
ANGULAR TOLERANCES	±.02	±.005
HOLE SIZES	±.05	±.010
MACHINE SURFACES	±.05	±.010

DRAWN G.JACKSON DATE 12 MAY 97
CHKD G.JACKSON DATE 12 MAY 97
MECH J.MAGINN DATE 9/18/98
ELEC F.SCHIRK DATE 7 AUG 98

AMPLIFIER RESEARCH

RF,LOW LEVEL ASSY

DWG. NO. 1010564

SCALE 1/1 SHEET 1 OF 1 REV C

50S1G3
50S1G4A
USED ON MODEL

BILL NO: 1010564-501 REV: D U/M: EA DRAWING NO: ARC-D\1010564
RF,LO LEVEL ASSY

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1010564	C	ASSY DWG,RF LOW LEVEL	EA	REF	ARC-D\1010564	
0020	1010567	C	WIRE LIST,LO LEVEL	EA	REF	ARC-A\1010567	
0100	1008810-501	C	PWB ASSY,VARIABLE GAIN AMP/DET	EA	1.000	ARC-D\1008810	A1
0120	1007454-501	H	PWB ASSY,LINEARIZER/CTRL BD	EA	1.000	ARC-B\1007454	A3
0130	1010589-501	B	PWB ASSY,LOW LEVEL "S" MODULE	EA	1.000	ARC-C\1010589	A4
0140	1010748-501	B	PWB ASSY,BIAS CTRL,1W S MODULE	EA	1.000	ARC-C\1010748	A5
0160	1009161-501	J	PWB ASSY,QUAD AMP,100S1G4	EA	2.000	ARC-A\1009161	A6 ,A8
0170	1011164-501	A	PWB ASSY,2 WAY SPLITTER #3	EA	1.000	ARC-B\1011164	A7
3100	57062		SW,TEMP SENSING,N.C.,OPEN AT 70C	EA	1.000	AIR\67L070	S1
5000	1008623-101	B	BRKT,MTG	EA	1.000	ARC-D\1008623	1
5010	1010565-101	A	HEATSINK	EA	1.000	ARC-D\1010565	2
5020	11020		SCREW,MACH,PAN HD,CROSS-REC,S/S,6-32 X .50	EA	6.000	\MS51957-30	3
5030	11014		SCREW,MACH,PAN HD,CROSS-REC,S/S,6-32 X .25	EA	2.000	\MS51957-26	4
5040	11016		SCREW,MACH,PAN HD,CROSS-REC,S/S,6-32 X .38	EA	9.000	\MS51957-28	5
5050	11024		SCREW,MACH,PAN HD,CROSS-REC,S/S,6-32 X 1.25	EA	4.000	\MS51957-35	6
5060	11025		SCREW,MACH,PAN HD,CROSS-REC,S/S,6-32 X 1.50	EA	12.000	\MS51957-36	7
5070	12024		WASH,FLAT,B/ZN PLTG,.312 OD X .164 ID X .125 THK	EA	8.000	\S785-M01-F21-.164	8
5080	12011		WASH,FLAT,S/S,#6,.312 OD X .156 ID X .035 THK	EA	8.000	\MS15795-805	9
5090	12048		WASH,LOCK,SPLIT,S/S,#6	EA	26.000	\MS35338-136	10
5110	1010568-501	B	HARNESS ASSY,LO LEVEL	EA	1.000		12
5140	69100		LUG,SHAKEPROOF,BENT,41/64 L,#6 STUD,DUAL HOLE	EA	2.000	HHS\1416-6	15
5150	69238	-	BASE,MTG,CABLE TIE,ADH BACK,3/4 X 3/4	EA	A/R	TAB\TC-344A	16
5160	11015		SCREW,MACH,PAN HD,CROSS-REC,S/S,6-32 X .31	EA	1.000	\MS51957-27	17
5170	69162		CABLE TIES,7/8 MAX BUNDLE DIA,4 L	EA	A/R	DEN\08432	18

BILL NO: 1010564-501 REV: D U/M: EA DRAWING NO: ARC-D\1010564
RF,LO LEVEL ASSY

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
5180	66116		TUBING,SHRINK,BLK,.093 EXP,.046 REC	FT	2.000	REM\F-P301	19
5190	11133		SCREW,MACH,PAN HD,CROSS-REC,S/S,6-32X.875	EA	2.000	\MS51957-33	20

BILL NO: 1010568-501 REV: B U/M: EA DRAWING NO:
HARNESS ASSY,LO LEVEL

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1010552	B	SCHEM DIAG,50S1G4A	EA	REF	ARC-D\1010552	
0020	1010567	C	WIRE LIST,LO LEVEL	EA	REF	ARC-A\1010567	
2200	41103		CONN,PLUG,9 PIN	EA	1.000	MOL\03-09-2092	J1
2210	41107		TERM,.093 DIA,CRIMP TYPE,M,18-22 AWG	EA	9.000	MOL\02-09-2118	J1
2220	41075		CONN,PLUG,6 PIN,(F)	EA	1.000	PNT\CT156F22-6-C	P1
2230	41060		CONN,THRU COVER,6 PIN	EA	1.000	PNT\TC156F-6-C	P1
2240	41074		CONN,PLUG,3 PIN(F)	EA	1.000	PNT\CT156F22-3-C	P2
2250	41059		CONN,THRU COVER,3 PIN	EA	1.000	PNT\TC156F-3-C	P2
2260	41076		CONN,PLUG,10 PIN,(F)	EA	2.000	PNT\CT156F22-10-T	P5 ,P6
2270	41061		CONN,THRU COVER,10 PIN	EA	2.000	PNT\TC156F-10-L	P5 ,P6
5000	66020		WIRE,TFE,18 AWG,STRANDED,TYPE E,BLU	IN	A/R		
5000	66025		WIRE,TFE,22 AWG,STRANDED,TYPE E,BLK	IN	A/R		
5000	66030		WIRE,TFE,22 AWG,STRANDED,TYPE E,GRN	IN	A/R		
5000	66031		WIRE,TFE,22 AWG,STRANDED,TYPE E,BLU	IN	A/R		
5000	66032		WIRE,TFE,22 AWG,STRANDED,TYPE E,VIO	IN	A/R		
5000	66034		WIRE,TFE,22 AWG,STRANDED,TYPE E,WHT	IN	A/R		
5000	66077		WIRE,TFE,22 AWG,STRANDED,TYPE E,WHT/BLK	IN	A/R		
5000	66078		WIRE,TFE,22 AWG,STRANDED,TYPE E,WHT/BRN	IN	A/R		
5000	66079		WIRE,TFE,22 AWG,STRANDED,TYPE E,WHT/RED	IN	A/R		
5000	66081		WIRE,TFE,22 AWG,STRANDED,TYPE E,WHT/YEL	IN	A/R		
5000	66083		WIRE,TFE,22 AWG,STRANDED,TYPE E,WHT/VIO	IN	A/R		

POWER IN FROM CONTROL PANEL

J1

C2 15pf

U1 AT-202

L1

R2 27

C5 1000pf

R3 27K

R4 27K

C3 15pf

L2

C6 1000pf

R14 1K

R5 1K

C7 1000pf

R1 270, 1/8W

Q1

C1 1000pf

C4 1000pf

L4

C8 1000pf

R6 120,1/8W

R7 220,1/8W

R8 270,1/8W

U2 GND

L5 C17 10pf R11 10,1/8W

L6 C18 3.9pf R12 39,1/8W

U3 GND

J2

SELECT OR OMIT AT TEST

R10 150, 1/8W

R13 50 1/8W

CR1

C14 68pf

C15 68pf

R9 50

C16 470pf

C10 2500pf

C9 2500pf

C11 2500pf

C12 2500pf

C13 2500pf

P5

J2

-1.5V

A1
SCHEMATIC
REFERENCE
1008812

P5

J2

A3
SCHEMATIC
REFERENCE
1007392

R3 1.5K

R36 1K

C4 0.1 -15V

R1 10K

CONTROL IN J1-6 -12.7V

R4 47K

U1/A MC1558U -3.0V

R2 1K

C2 0.1 +15V

R5 100K

+15V J1-5

R6 56K

Q2 2N3904

R7 27K

-15V J1-4

R8 8.2K -2.9V

R9 2.0K

C3 0.1 -15V

Q3 2N3904

R10 8.2K

GND J1-1

R11 10K -3.7V

R12 3.3K

J1-3

Q4 2N3904

R13 2.2K

R14 10K -3.9V

R15 3.6K

R19 10K

R18 10K -0.1V

U1/B MC1558U -12.6V

R17 3.3K

R21 10K

R20 10K -0.1V

R22 56

-15V

R16 1.5K

-3.9V

4.3V

+15V

R23 15K -15V

R24 3.9K

Q1 2N3906

R27 220,1W

C9 0.22

R25 3.3K 3.7V

R26 10K

C6 0.1

R37 22K

C10 220pf

R28 330K

C8 0.1 -15V

U2/A MC1558U

R29 10K

U2/B MC1558U -12.7V

R31 100 J1-2

R30 22K

R32 12.1K

R33 10K

R34 100K

+15V C7 0.1

C1 0.01

R35 10K

P/O CONTROL PANEL

10K

12K

TO CONTROL IN

VOLTAGE READINGS @ MAX RF GAIN
POWER IN <-10dBm

ECN	DATE	REV
XX XX97	AUG 97	1
XX XX	29AUG97	2
REL	18NOV97	-
XXXX	19JAN00	A

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED DO NOT SCALE DRAWING DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS ALL THREADS ARE UNIFIED NATIONAL SCREW, CLASS 2 REMOVE ALL BURRS AND SHARP EDGES

DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.05	±.015

ANGULAR DIMENSIONS ±1°

50S1G4
USED ON MODEL

DRAWN J.H.REED DATE 07 JULY 97
CHKD J.H.REED DATE 29 AUG 97
MECH J.MACINN DATE 20 NOV 97
ELEC F.SCHIRK DATE 20 NOV 97

AMPLIFIER RESEARCH

SCHEMATIC
VAR.GAIN/PROT.CIR.

DWG. NO. 1008816

SCALE NONE SHEET 1 OF 1 REV. A

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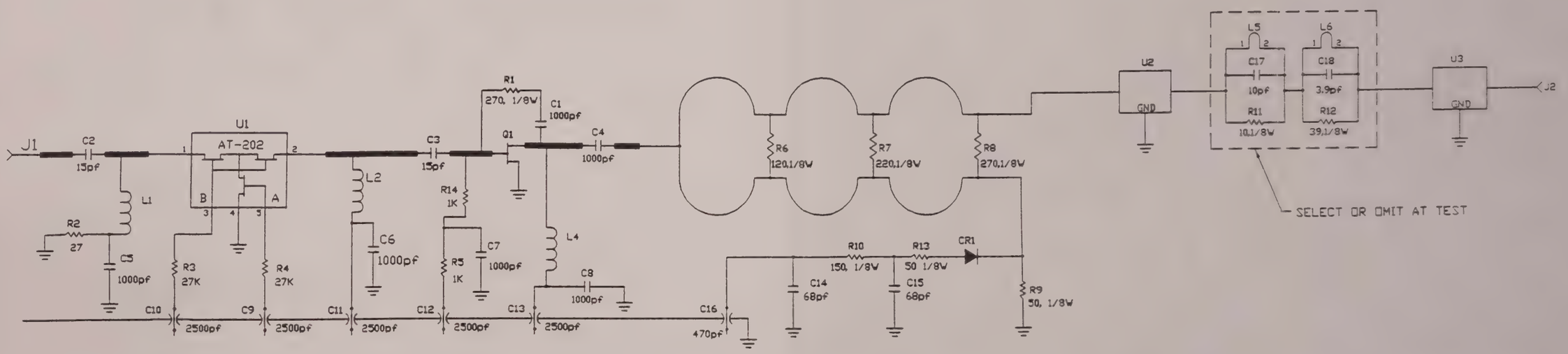
ECN	DATE	REV
XXXX	XX MAY 97	1
XXXX	XX JUNE 97	2
XXXX	XX AUG 97	3
RE...	XX NOV 97	-



NOTES:

1.0 UNLESS OTHERWISE INDICATED, ALL RESISTORS ARE IN OHMS.

2.0 ALL CAPACITORS ARE IN MICROFARADS, AND ARE 50 VOLTS,UNLESS INDICATED.

REFERENCE DESIGNATION TABLE						
LAST DESIGNATION USED						
U3	CR1	L6	Q1	C18	J2	R12
DESIGNATIONS NOT USED						
		L3				

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED DO NOT SCALE DRAWING DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS ALL THREADS ARE UNIFIED NATIONAL REMOVE ALL BURRS AND SHARP EDGES

MISC. MOTIONS	SCALE 2/3 DRAWING	SCALE 1/2 DETAILS

SOLDER

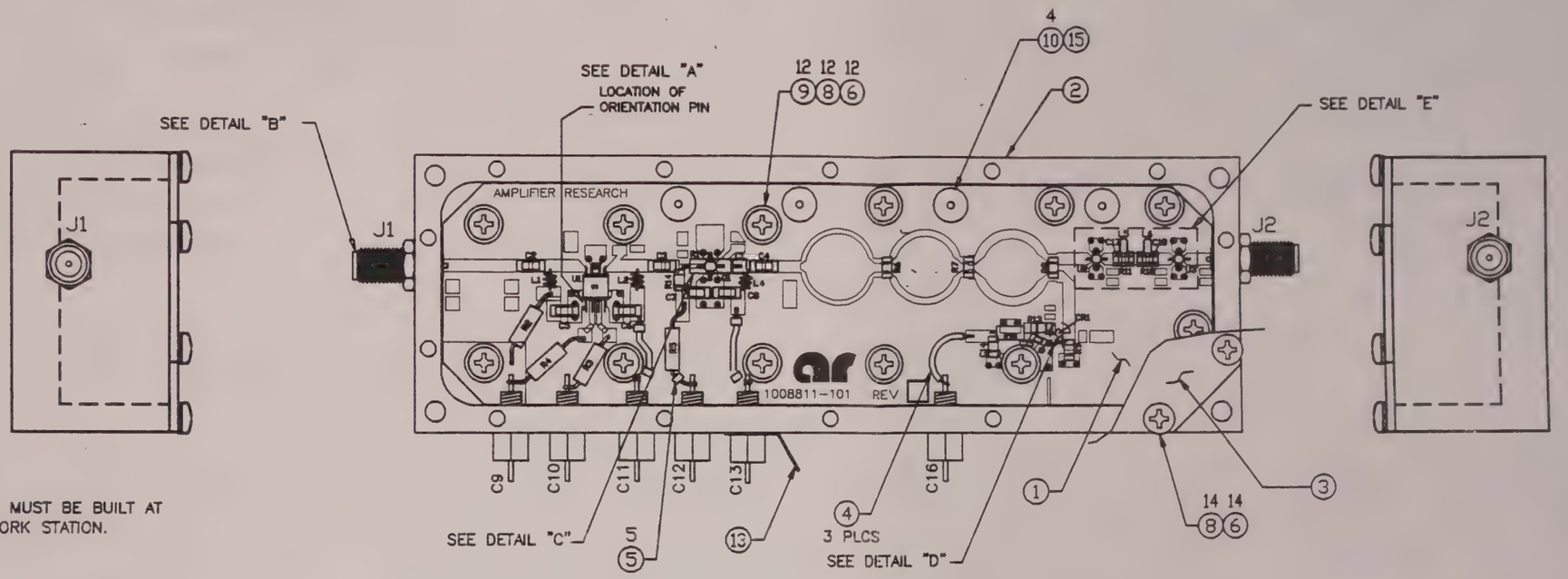
DRAWN J.M.REED DATE 30 MAY 97
CHKD J.M.REED DATE 22 JULY 97
MECH DATE
ELEC

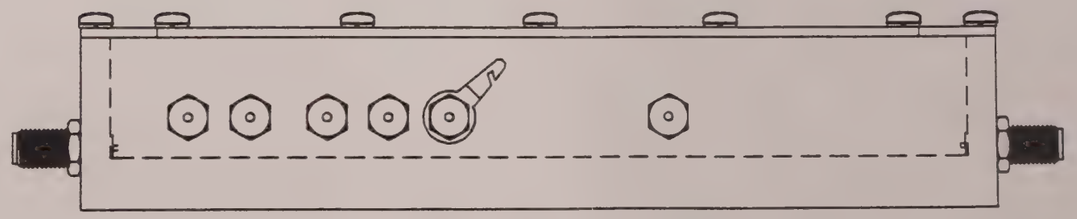
AMPLIFIER RESEARCH

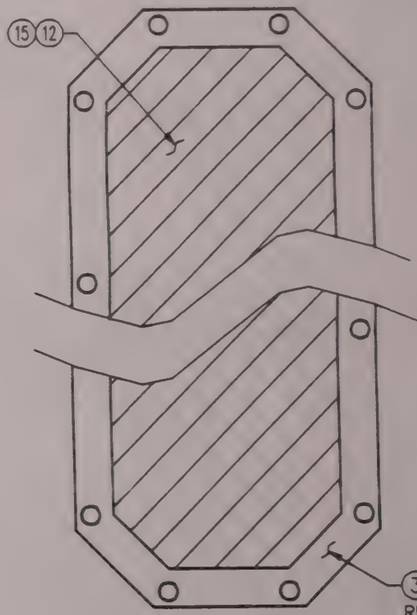
SCHEMATIC
VARIABLE GAIN AMP\DET

DWG NO. 1008812

SCALE SHEET REV







THIS ENTIRE ASSEMBLY MUST BE BUILT AT A STATIC APPROVED WORK STATION.

ASSEMBLY PROCEDURE
VARIABLE GAIN AMP

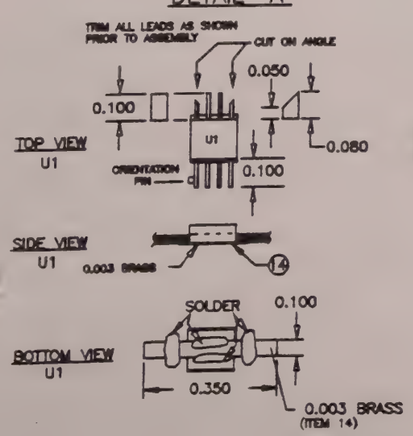
1) INSTALL U1 TO P.C. BOARD. SOLDER 3 MIL. THICK TINNED BRASS FROM BOTTOM OF U1 TO GROUND PLANE. U1 INSTALLATION MUST BE DONE AT A STATIC APPROVED WORK STATION, SEE DETAIL "A".
2) INSTALL P.C. BOARD INTO HOUSING.
3) INSTALL J1 AND J2, PREPARE J1 AND J2 ACCORDING TO DIMENSIONS SHOWN IN DETAIL "B".
4) INSTALL FEEDTHRU C9 TO C13 INTO HOUSING.
5) INSTALL ALL OF THE CERAMIC CHIP CAPS EXCEPT C1, C17, C18.
6) INSTALL L1 THRU L4.
7) INSTALL R2 TO P.C. BOARD, KEEP LENGTHS AS SHORT AS POSSIBLE.
8) INSTALL R3 THRU R5 AND ITEM #4 (22 AWG SOLID WHITE WIRE) BETWEEN FEEDTHRU AND P.C. BOARD. CUT LEADS AS SHORT AS POSSIBLE.

NOTE: FET INSTALLATION MUST BE DONE AT A STATIC APPROVED WORK STATION. PERSONS MUST BE FAMILIAR WITH THE PROCEDURES. THE FET CAN BE DESTROYED EASILY BOTH ELECTRONICALLY AND MECHANICALLY.

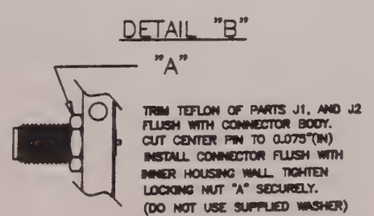
FET INSTALLATION:

1) WITH A GROUNDED SOLDERING IRON, SOLDER Q1 INTO THE CIRCUIT.
2) INSTALL CHIP CAP C1 AS SHOWN IN DETAIL "C".
3) INSTALL RESISTOR R1 AS SHOWN IN DETAIL "C".
4) ITEMS C17, C18, R11, R12, L5, L6, U2, AND U3, WILL BE INSTALLED OR OMITTED AT TEST.

DETAIL "A"

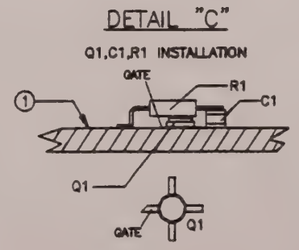


DETAIL "B"



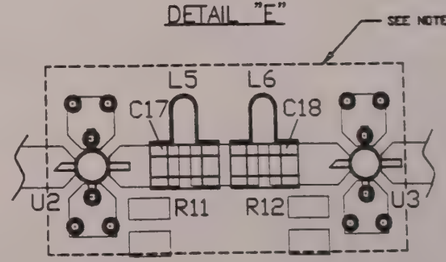
TRIM TEFLON OF PARTS J1, AND J2 FLUSH WITH CONNECTOR BODY. CUT CENTER PIN TO 0.075"(IN) INSTALL CONNECTOR FLUSH WITH INNER HOUSING WALL. TIGHTEN LOCKING NUT "A" SECURELY. (DO NOT USE SUPPLIED WASHER)

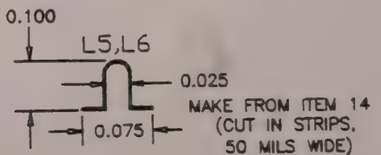
DETAIL "C"



DETAIL "D"

DETAIL "E"





MAKE FROM ITEM 14 (CUT IN STRIPS, 50 MILS WIDE)

FOR BOM SEE: 1008810-501

QTY. REQD.	PART NO.	DESCRIPTION
	PARTS LIST	

UNLESS OTHERWISE SPECIFIED DO NOT SCALE DRAWING DIMENSIONS ARE IN INCHES AND TOLERANCES ARE AS FOLLOWS: ALL ANGLES ± 1° ALL FRACTIONS ± 1/64 ALL DECIMALS .XX ± .01 .XXX ± .005

	2 PLACE DECIMALS	3 PLACE DECIMALS
OVER 6 IN	ALIGN	ALIGN
OVER 1 TO 6 IN	ALIGN	ALIGN
OVER 30	ALIGN	ALIGN
REGULAR TOLERANCE 1/2°		

DRAWN J.J.REED DATE 08 JUNE 97
CHKD J.J.REED DATE 10 JULY 97
ENGR J.J.REED DATE 21 NOV 97
M.E. F.SCHIRK DATE 20 NOV 97

ASSEMBLY DRAWING
VARIABLE GAIN AMP/DET.

DWG. NO. 1008810

SCALE 2/1 SHEET 1 OF 1 REV E

AMPLIFIER RESEARCH

08:59:33 06 DEC 2000 * * * SINGLE LEVEL BILL OF MATERIAL LISTING * * * REPORT: E0056 PAGE: 1

BILL NO: 1008810-501 REV: C U/M: EA DRAWING NO: ARC-D\1008810
PWB ASSY,VARIABLE GAIN AMP/DET

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1008812	-	SCHEM DIAG,VARIABLE GAIN AMP/DET	EA	REF	ARC-D\1008812	
0020	1008810	E	ASSY DWG,VARIABLE GAIN AMP/DET	EA	REF	ARC-D\1008810	
0400	27039		CAPR,CHIP,CER,1000pF,10%,50V	EA	6.000	ATC\700B102MCA50X	C1 ,C4 C5 ,C6 C7 ,C8
0410	27031		CAPR,CHIP,15pF,20%,500V	EA	2.000	DIL\C17AH150MATXL	C2 ,C3
0420	27099		CAPR,FEED-THRU,FILT,2500PF,500V	EA	5.000	MET\51-719-011	C9 ,C10 C11 ,C12 C13
0430	27261		CAPR,CHIP,68pF,10%,150V	EA	2.000	ATC\100A680KCA150X	C14 ,C15
0440	27098		CAPR,FEED-THRU,FILT,470PF,10%	EA	1.000	MET\FB2B-471GMV	C16
0450	27029		CAPR,CHIP,10pF,10%,500V	EA	REF	DIL\C17AH100K4TXL	C17
0460	27259		CAPR,CHIP,CER,3.9pF,500V	EA	REF	ATC\100B3R9CP500X	C18
0700	30039		DIODE,SCHOTTKY,DET,MICRO-WAVE	EA	1.000	H-P\5082-2794	CR1
1500	41243		CONN,COAX,BULKHD JACK,SMA,(F)	EA	2.000	DTA\1321000K82165	J1 ,J2
1800	1007507-101	-	INDUCTOR,AIR WOUND,.050ID,34GA,4T	EA	2.000	ARC-A\1007507	L1 ,L4
1810	1007507-103	-	INDUCTOR,AIR WOUND,.050ID,34GA,7T	EA	1.000	ARC-A\1007507	L2
2500	1000034-176	BG	XSTR,RF,LOW NOISE,GaAsFET	EA	1.000	ARC-A\1000034	Q1
2700	55511-2700J		RES,FXD,CARBON COMP,270,5%,1/8W	EA	1.000	A-B\BB2715	R1
2710	55512-27R0J		RES,FXD,CARBON COMP,27.5%,1/4W	EA	1.000	A-B\CB2705	R2
2720	55612-2702J		RES,FXD,METAL FILM,27K,5%,1/4-1/2W	EA	2.000	TRW\GP55-2702+/-5%	R3 ,R4
2730	55612-1001J		RES,FXD,METAL FILM,1K,5%,1/4-1/2W	EA	1.000	TRW\GP55-1001+/-5%	R5
2740	55647-1200J		RES,FXD,CHIP,120,5%,1/8W	EA	1.000	D-K\P120-ECT-ND	R6
2750	55647-2200J		RES,FXD,CHIP,220,5%,1/8W	EA	1.000	D-K\P220-ECT-ND	R7
2760	55647-2700J		RES,FXD,CHIP,270,5%,1/8W	EA	1.000	D-K\P270-ECT-ND	R8
2770	55647-51R0J		RES,FXD CHIP,51 OHM,1/8W,5%	EA	2.000	D-K\ P51-ECT-ND	R9 ,R13

BILL NO: 1008810-501 REV: C U/M: EA DRAWING NO: ARC-D\1008810
PWB ASSY,VARIABLE GAIN AMP/DET

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
2780	55511-1500J		RES,FXD,CARBON COMP,150,5%,1/8W	EA	1.000	A-B\BB1515	R10
2790	55647-10R0J		RES,FXD,CHIP,10,5%,1/8W	EA REF		D-K\P10-ECT-ND	R11
2800	55647-39R0J		RES,FXD,CHIP,39,5%,1/8W	EA REF		D-K\P39-ECT-ND	R12
2810	55647-1001J		RES,FXD,CHIP,1K,1/8,5%	EA	1.000	D-K\P1.0K-ECT-ND	R14
3700	25035		ATTEN,V VAR,DC-5 GHZ	EA	1.000	ANZ\AT-202	U1
3710	25054	-	ATTEN,FXD,3dB,1W,70 MIL PKG	EA	1.000	MIN\PAT-3	U2
3720	25069		ATTEN,FXD,2dB,1W,70 MIL PKG	EA	1.000	MIN\PAT-2	U3
5000	1008811-101	A	PWB,VARIABLE GAIN AMP/DET	EA	1.000	ARC-C\1008811	1
5010	1008813-101	A	HSG,VARIABLE GAIN AMP/DET	EA	1.000	ARC-D\1008813	2
5020	1007432-101	-	COVER,1 WATT AMP	EA	1.000	ARC-B\1007432	3
5030	66035		WIRE,TFE,22 AWG,SOLID WHT	IN A/R		WEI\2822	4
5040	1000643-401	C	CORE,FERRITE,BEAD	EA	5.000	ARC\1000643	5
5050	11010		SCREW,MACH,PAN HD,CROSS-REC,S/S,4-40 X .25	EA	26.000	\MS51957-13	6
5070	12047		WASH,LOCK,SPLIT,S/S,#4	EA	26.000	\MS35338-135	8
5080	12010		WASH,FLAT,S/S,#4,.250 OD X .125 ID X .022 THK	EA	12.000	\MS15795-803	9
5090	1000643-402	C	CORE,FERRITE,BEAD,CMD5005	EA	4.000	ARC\1000643	10
5110	69332		FOAM,CONDUCTIVE	IN A/R		MMM\2802	12
5120	69101		LUG,SOLDER,BENT TONGUE,3/4 L,3/8 OD,1/4 STUD	EA	1.000	HHS\1496	13
5130	77144	-	SHIM,BRASS,6.00X.003 THK (ROLL 100")	IN	2.000	MSS\00051037	14
5140	77066		ADH,RTV,SELF-LVL,CLEAR	OZ A/R		G-E\GE118	15

BILL NO: 1008805-501 REV: - U/M: EA DRAWING NO:
HARNESS ASSY,PRE-AMP\LEVELER

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1007691	C	SCHEM DIAG,VAR.GAIN/PROT CKT	EA	REF	ARC-D\1007691	
0020	1008803	A	WIRE LIST,PREAMP\LEVELER	EA	REF	ARC-A\1008803	
2200	41076		CONN,PLUG,10 PIN,(F)	EA	1.000	PNT\CT156F22-10-T	P5
2210	41061		CONN,THRU COVER,10 PIN	EA	1.000	PNT\TC156F-10-L	P5
5000	66025		WIRE,TFE,22 AWG,STRANDED,TYPE E,BLK	IN	A/R		
5000	66030		WIRE,TFE,22 AWG,STRANDED,TYPE E,GRN	IN	A/R		
5000	66031		WIRE,TFE,22 AWG,STRANDED,TYPE E,BLU	IN	A/R		
5000	66032		WIRE,TFE,22 AWG,STRANDED,TYPE E,VIO	IN	A/R		
5000	66034		WIRE,TFE,22 AWG,STRANDED,TYPE E,WHT	IN	A/R		
5000	66083		WIRE,TFE,22 AWG,STRANDED,TYPE E,WHT/VIO	IN	A/R		

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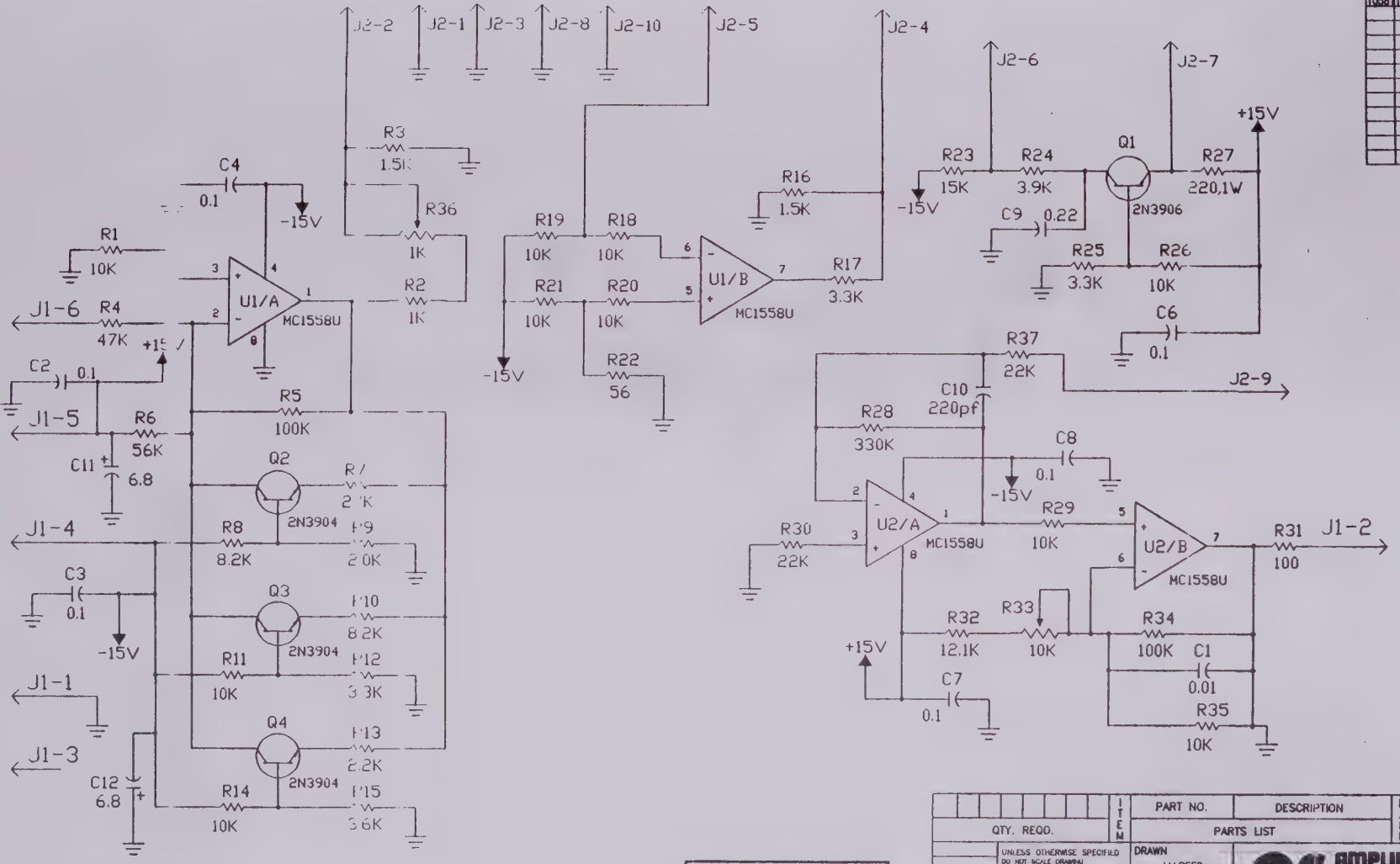
ECN	DATE	REV
-	30JUN95	1
-	14AUG95	2
-	31AUG95	3
REL	1NOV95	-
81422	9NOV95	A
81471	30OCT97	B
92530	7JAN98	C
97977	16MAR98	D
101928	28SEP98	E
105811	8JUN00	F



REFERENCE DESIGNATION TABLE			
LAST DESIGNATION USED			
R37	C12	Q4	U2
DESIGNATIONS NOT USED			
	C5		

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED DO NOT SCALE DRAWING. DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS. ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2. REMOVE ALL BURRS AND SHARP EDGES.

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015

ANGULAR DIMENSIONS 1/2°

1S1G4
USED ON MODEL

DRAWN J.H.REED DATE 30 JUNE,1995
CHKD J.H.REED DATE 5 JULY,1995
MECH J.MAGINN DATE 20 NOV 95
ELEC F.SCHIRK DATE 20 NOV 95

AMPLIFIER RESEARCH

SCHEMATIC
LINEARIZER CONTROL

DWG. NO. 1007392

SCALE NONE | SHEET 1 OF 1 | REV. F

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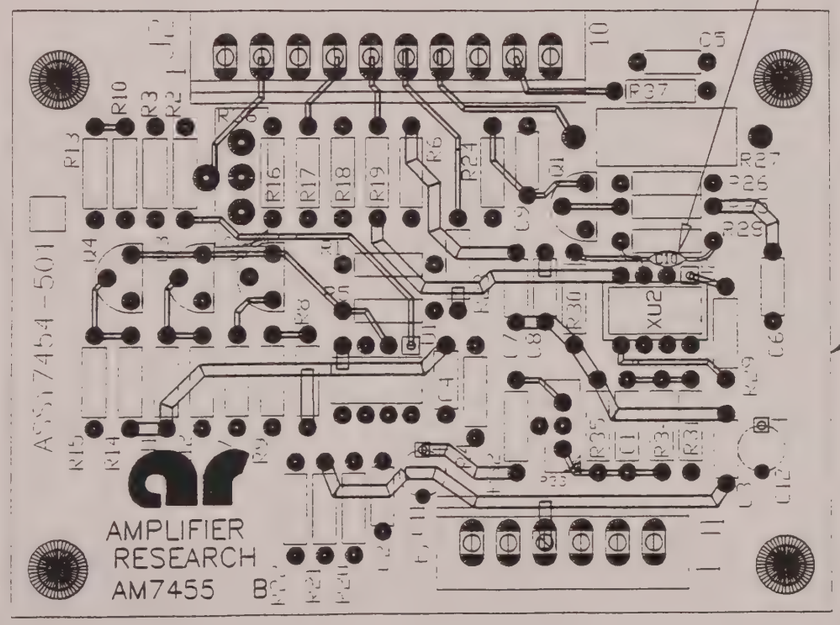
ECN	DATE	REV
REL	60CT95	–
8142	29NOV95	A
8796	25MAR97	B
9147	130CT97	C
9797	26MAR99	D
10079	21JUL99	E

SEE NOTE 1.0



1

NOTES:

1.0 SOLDER C10 ACROSS R28.
2.0 TRIM LEADS ON J1 AND J2.

FOR BOM SEE 1007454-501

ITEM	PART NO.	DESCRIPTION	MARK	FIN	MATL
QTY. REQD.	PARTS LIST				
10S1G4					
5S1G4					
1S1G4					
USED ON MODEL					

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES
INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015
ANGLES	±1°	

DRAWN J.H.REED
DATE 31 MAR 1995
CHKD J.H.REED
DATE 1 JUNE,1995
MECH J.MAGINN
DATE 9 NOV 95
ELEC F.SCHIRK
DATE 3 NOV 95

AMPLIFIER RESEARCH

PWB ASSY
LINEARIZER/CONTROL

DWG. NO. 1007454

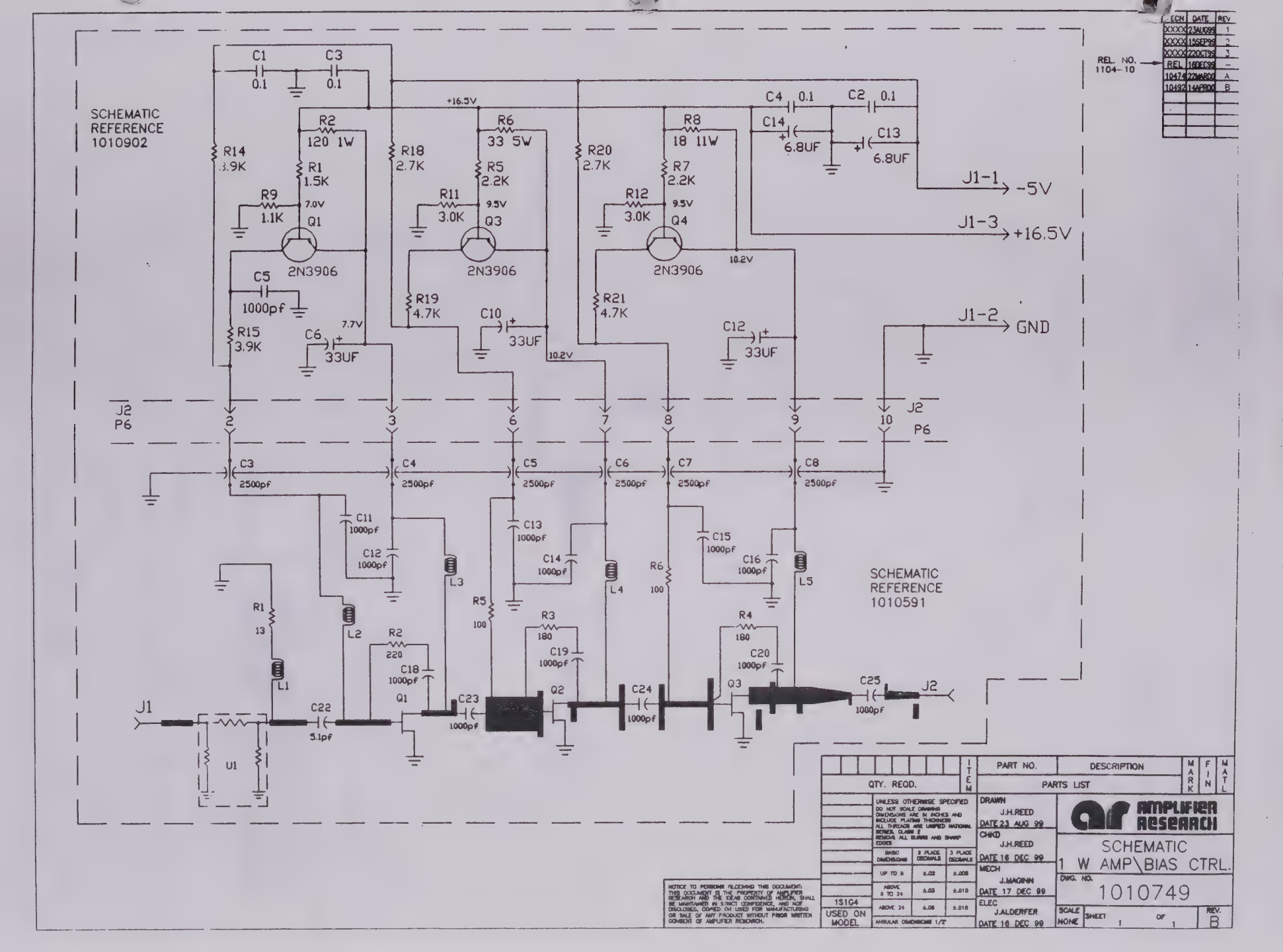
SCALE NONE | SHEET . OF . | REV. C

BILL NO: 1007454-501 REV: H U/M: EA DRAWING NO: ARC-B\1007454
PWB ASSY,LINEARIZER/CTRL BD

SEQ	PART NUMBER	REV	DESCRIPTION	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1007392	F	SCHEM DIAG,LINEARIZER CONT.	EA	REF	ARC-C\1007392	
0020	1007454	E	ASSY DWG,PWB ASSY,LINEARIZER/CTRL BD	EA	REF	ARC-B\1007454	
0400	27189		CAPR,CER,0.01uF,20%,500V	EA	1.000	SPR\5GAS-S10	C1
0410	27236		CAPR,FXD,DIP SPACED CER,.1UF,50VDC	EA	6.000	AVX\MD015C104MAA	C2 ,C3 C4 ,C6 C7 ,C8
0420	27210		CAPR,CER,0.22uF,50V	EA	1.000	CRL\CW30C224K	C9
0430	27183		CAPR,CER,220pF,10%,500/1000V	EA	1.000	CRL\DD221	C10
0440	27055		CAPR,TANT,6.8UF,50V	EA	2.000	MAL\TDC685K050NLF	C11 ,C12
1500	41083		CONN,LOCKING HEADER,STR,6 PIN	EA	1.000	PNT\MLSS156-6-C	J1
1510	41084		CONN,LOCKING HEADER,STR,10 PIN,SQR POSTS	EA	1.000	PNT\MLSS156-10-L	J2
2500	2N3906		XSTR,SWNG,PNP,40V,0.2A,1W	EA	1.000	ARE\2N3906	Q1
2510	2N3904		XSTR,SWNG,NPN,40V,0.2A,1W	EA	3.000		Q2 ,Q3 Q4
2700	55612-1002J		RES,FXD,METAL FILM,10K,5%,1/4-1/2W	EA	10.000	TRW\GP55-1002+/-5%	R1 ,R11 R14 ,R18 R19 ,R20 R21 ,R26 R29 ,R35
2705	55612-1001J		RES,FXD,METAL FILM,1K,5%,1/4-1/2W	EA	1.000	TRW\GP55-1001+/-5%	R2
2710	55612-1501J		RES,FXD,METAL FILM,1.5K,5%,1/4-1/2W	EA	2.000	TRW\GP55-1501+/-5%	R3 ,R16
2720	55612-4702J		RES,FXD,METAL FILM,47K,5%,1/4-1/2W	EA	1.000	TRW\GP55-4702+/-5%	R4
2730	55612-1003J		RES,FXD,METAL FILM,100K,5%,1/4-1/2W	EA	2.000	TRW\GP55-1003+/-5%	R5 ,R34
2740	55612-5602J		RES,FXD,METAL FILM,56K,5%,1/4-/12W	EA	1.000	TRW\GP55-5602+/-5%	R6
2750	55612-2702J		RES,FXD,METAL FILM,27K,5%,1/4-1/2W	EA	1.000	TRW\GP55-2702+/-5%	R7
2760	55612-8201J		RES,FXD,METAL FILM,8.2K,5%,1/4-1/2W	EA	2.000	TRW\GP55-8201+/-5%	R8 ,R10
2770	55612-2001J		RES,FXD,METAL FILM,2.0K,5%,1/4-1/2W	EA	1.000	TRW\GP55-2001+/-5%	R9
2780	55612-3301J		RES,FXD,METAL FILM,3.3K,5%,1/4-1/2W	EA	3.000	TRW\GP55-3301+/-5%	R12 ,R17

BILL NO: 1007454-501 REV: H U/M: EA DRAWING NO: ARC-B\1007454
PWB ASSY,LINEARIZER/CTRL BD

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
							R25
2783	55612-2201J		RES,FXD,METAL FILM,2.2K,5%,1/4-1/2W	EA	1.000	TRW\GP55-2201+/-5%	R13
2787	55612-3601F		RES,FXD,PRECISION,3.6K,1%,1/4-1/2W,CHAR.D	EA	1.000	MEP\RN55D3601F	R15
2790	55612-3901J		RES,FXD,METAL FILM,3.9K,5%,1/4-1/2W	EA	1.000	TRW\GP55-3901+/-5%	R24
2800	55612-56R0J		RES,FXD,METAL FILM,56,5%,1/4-1/2W	EA	1.000	TRW\GP55-56R0+/-5%	R22
2810	55612-1502J		RES,FXD,METAL FILM,15K,5%,1/4-1/2W	EA	1.000	TRW\GP55-1502+/-5%	R23
2820	55514-2200J		RES,FXD,CARBON COMP,220,5%,1W	EA	1.000	A-B\GB2215	R27
2830	55612-3303J		RES,FXD,METAL FILM,330K,5%,1/4-/12W	EA	1.000	TRW\GP55-3303+/-5%	R28
2840	55612-2202J		RES,FXD,METAL FILM,22K,5%,1/4-1/2W	EA	2.000	TRW\GP55-2202+/-5%	R30 ,R37
2850	55612-1212F		RES,FXD,METAL FILM,12.1K,5%,1/4-1/2W	EA	1.000		R32
2860	55919		RES,VAR,CERMET,MULTITURN,TOP ADJ,10K,10%,1/2W	EA	1.000	BOR\3299Y-1-103	R33
2870	55917		RES,VAR,CERMET,MULTITURN,TOP ADJ,1K,10%,1W	EA	1.000	MEP\RJ24FW102	R36
2880	55612-1000J		RES,FXD,METAL FILM,100,5%,1/4-1/2	EA	1.000	TRW\GP55-1000+/-5%	R31
3700	60039		INTEGRATED CKT,DUAL OP AMP	EA	2.000	MOT\MC1558U	U1 ,U2
4500	73010		SOCKET,I.C.,8 PIN,DIP	EA	2.000	TII\C93-08-02	XU1 ,XU2
5000	1007455-101	D	PWB,LINEARIZER/CTRL BD	EA	1.000	ARC-B\1007455	1
5010	66041		WIRE,TFE,26 AWG,STRANDED,TYPE E,WHT	IN	A/R		2


SCHEMATIC REFERENCE 1010902
C1 0.1
C3 0.1
+16.5V
R2 120 1W
R1 1.5K
R9 1.1K
7.0V
Q1
2N3906
R14 3.9K
R18 2.7K
R6 33 5W
R5 2.2K
R11 3.0K
9.5V
Q3
2N3906
R20 2.7K
R8 18 11W
R7 2.2K
R12 3.0K
9.5V
Q4
2N3906
10.2V
C4 0.1
C2 0.1
C14 6.8UF
C13 6.8UF
J1-1 -5V
J1-3 +16.5V
C5 1000pf
R15 3.9K
7.7V
C6 33UF
R19 4.7K
C10 33UF
10.2V
R21 4.7K
C12 33UF
J1-2 GND
J2 P6
2
3
6
7
8
9
10
J2 P6
C3 2500pf
C4 2500pf
C5 2500pf
C6 2500pf
C7 2500pf
C8 2500pf
C11 1000pf
C12 1000pf
C13 1000pf
C14 1000pf
C15 1000pf
C16 1000pf
L3
L4
L5
R6 100
R5 100
R3 180
R4 180
C19 1000pf
C20 1000pf
SCHEMATIC REFERENCE 1010591
R1 13
L1
L2
R2 220
C18 1000pf
Q1
Q2
Q3
C23 1000pf
C24 1000pf
C25 1000pf
J1
J2
C22 5.1pf
U1
REL. NO. 1104-10
ECN DATE REV
XXXX 23AUG99 1
XXXX 15SEP99 2
XXXX 22OCT99 3
REL 16DEC99 –
10474 22MAR00 A
10492 14APR00 B
ITEM QTY. REQD. PART NO. DESCRIPTION PARTS LIST MARK FIN MATL
UNLESS OTHERWISE SPECIFIED DO NOT SCALE DRAWING DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS ALL THREADS ARE UNIFIED NATIONAL (CLASS 2) REMOVE ALL BURRS AND SHARP EDGES
BASIC DIMENSIONS 2 PLACE DECIMALS 3 PLACE DECIMALS
UP TO 6 ±.02 ±.005
ABOVE 6 TO 24 ±.03 ±.010
ABOVE 24 ±.05 ±.015
ANGULAR DIMENSIONS 1/2°
1S1C4 USED ON MODEL
DRAWN J.H.REED DATE 23 AUG 99
CHKD J.H.REED DATE 16 DEC 99
MECH J.MAGINN DATE 17 DEC 99
ELEC J.ALDERFER DATE 16 DEC 99
AMPLIFIER RESEARCH
SCHEMATIC 1 W AMP\BIAS CTRL.
DWG. NO. 1010749
SCALE NONE SHEET 1 OF 1 REV. B
NOTICE TO PERSONS RECEIVING THIS DOCUMENT: THIS DOCUMENT IS THE PROPERTY OF AMPLIFIER RESEARCH AND THE DATA CONTAINED HEREIN, SHALL BE MAINTAINED IN STRICT CONFIDENCE, AND NOT DISCLOSED, COPIED OR USED FOR MANUFACTURING OR SALE OF ANY PRODUCT WITHOUT PRIOR WRITTEN CONSENT OF AMPLIFIER RESEARCH.

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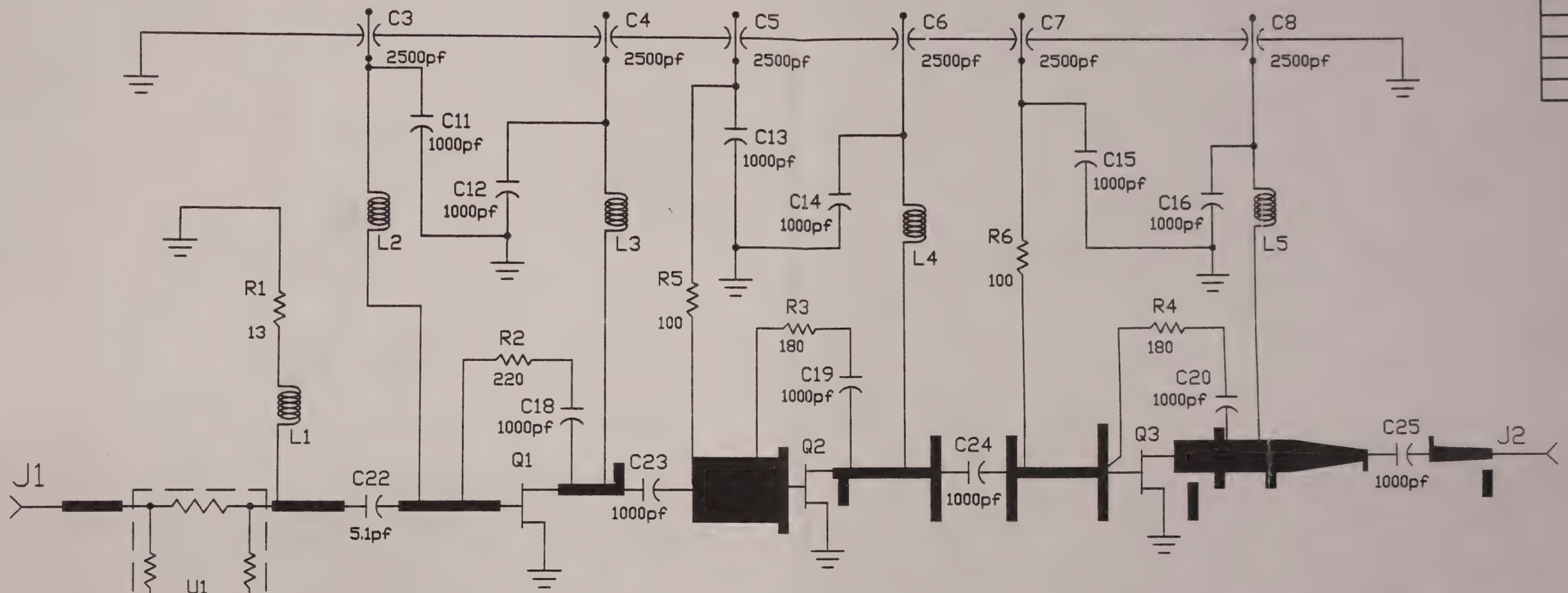
ECN	DATE	REV
XXXX	18MAY99	1
XXXX	15SEP99	2
REL	16DEC99	–

REL. NO. 1104-10



REFERENCE DESIGNATION TABLE			
LAST DESIGNATION USED			
Q3	C25	L6	R6
DESIGNATIONS NOT USED			
	C1,C2,C9,C10, C17,C21		

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015

ANGULAR DIMENSIONS 1/2°

1S1G4
USED ON MODEL

DRAWN J.H.REED DATE 18 MAY 99
CHKD J.H.REED DATE 16 DEC 99
MECH J. Maginn DATE 12/17/99
ELEC [signature] DATE 16/DEC/99

AMPLIFIER RESEARCH

SCHEMATIC
LOW LEVEL "S" MODULE

DWG. NO. 1010591

SCALE NONE | SHEET 1 OF 1 | REV. —

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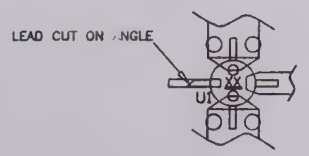
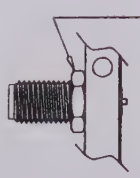
ECN	DATE	REV
–	15SEP99	1
–	03DEC99	2
REL	19JAN00	–
10492	14APR00	A
10507	12JUL00	B
10673	26SEP00	C

REL. NO. 1113-09

DETAIL "A"

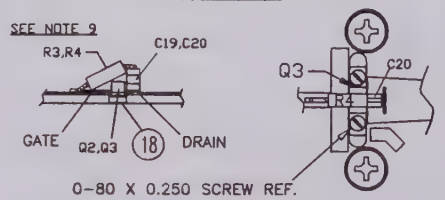


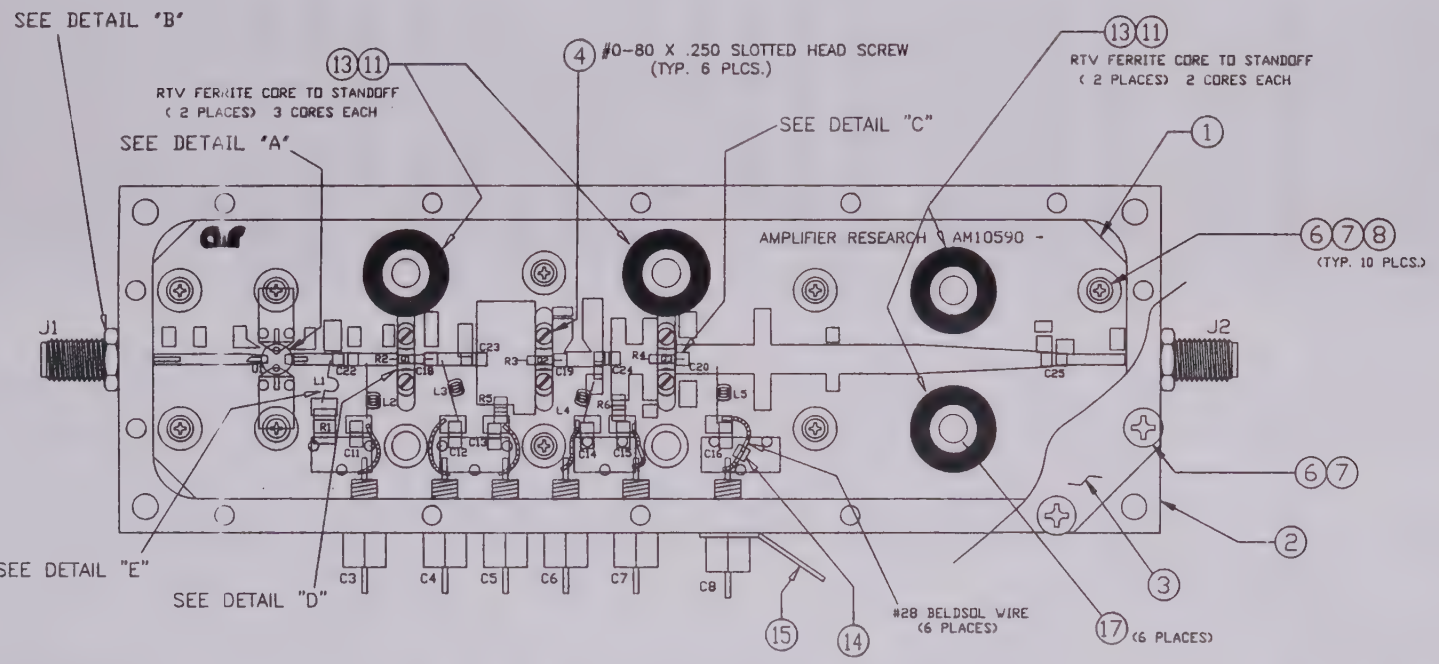
DETAIL "B"



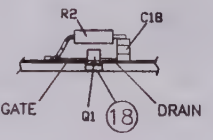
TRIM TEFLON OF PARTS J1 & J2 FLUSH WITH CONNECTOR BODY. CUT CENTER PIN TO 0.075"(IN) INSTALL CONNECTOR FLUSH WITH INNER HOUSING WALL. TIGHTEN LOCKING NUT "A" SECURELY. (DO NOT USE SUPPLIED WASHER)

DETAIL "C"

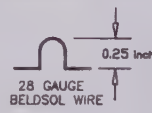




DETAIL "D"



DETAIL "E"



ASSEMBLY PROCEDURE
1 WATT AMP

1) INSTALL P.C. BOARD INTO HOUSING - CENTER MOUNTING SCREW HOLES IN SLOTS FOR Q1, Q2 AND Q3.
2) TEMPORARILY USE MOUNTING HARDWARE TO HOLD BOARD IN PLACE PRIOR TO INSTALLING STANDOFFS, ITEM 17 AT COMPLETION.
3) INSTALL CONNECTOR J1 AND J2 INTO HOUSING.
   NOTE: SEE DETAIL "B".
4) INSTALL FEEDTHRU C3 THRU C8 INTO HOUSING.
5) INSTALL R1, R5, R6 (WITH FACE VALUE DOWN).
6) INSTALL ALL OF THE CERAMIC CHIP CAPS EXCEPT C18, C19, AND C20.
7) INSTALL L1 THRU L5, INSTALL L1 AS SHOWNCLOSE TO C22).
8) INSTALL #28 BELDSOL JUMPER WIRES BETWEEN FEEDTHRU AND P.C. BOARD.

NOTE: THE FOLLOWING FET INSTALLATION MUST BE DONE AT A STATIC APPROVED WORK STATION. PERSONS HANDLING AND INSTALLING THE FET'S MUST BE FAMILIAR WITH THE PROCEDURE THE FET CAN BE DESTROYED BOTH ELECTRICALLY AND MECHANICALLY.

9) FET INSTALLATION,(GATE LEADS OF Q1-Q3 MUST FACE TOWARD J1).
   NOTE: STEPS 1 THRU 6 ABOVE MUST BE COMPLETED BEFORE INSTALLING FETS.
   (a) INSTALL SHIM P/N 1011381-101, UNDER Q1, Q2, AND Q3.
   (b) INSTALL 0-80 SCREWS TO HOLD Q1-Q3, CIRCUIT. TIGHTEN SCREWS, THEN LOOSEN 1/4 TURN BEFORE SOLDERING.
10) INSTALL FEEDBACK CAPACITORS C18, C19, AND C20 .
11) INSTALL FEEDBACK RESISTOR R2 AT Q1 PER DETAIL "D".
12) INSTALL FEEDBACK RESISTORS R3 AND R4 TO Q2 AND Q3 PER DETAIL "C".
13) TIGHTEN SCREWS ON Q1 - Q3.

FOR BOM, SEE 1010589-501

QTY. REQD.	ITEM	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED DO NOT SCALE DRAWING. DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS. ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2. REMOVE ALL BURRS AND SHARP EDGES.

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015

ANGULAR DIMENSIONS 1/2°

10S1G4
USED ON MODEL

DRAWN J.H.REED DATE 15 SEPT 99
CHKD J.H.REED DATE 19 JAN 00
MECH J.MAGINN DATE 27 JAN 00
ELEC J.ALDERFER DATE 27 JAN 00

AMPLIFIER RESEARCH

ASSEMBLY
PWB, 1 WATT AMP

DWG. NO. 1010589

SCALE 2/1 SHEET 1 OF 1 REV. C

BILL NO: 1010589-501 REV: B U/M: EA DRAWING NO: ARC-C\1010589
PWB ASSY,LOW LEVEL "S" MODULE

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1010591	-	SCHEM DIAG,LOW LEVEL "S" MODULE	EA	REF	ARC-B\1010591	
0020	1010589	C	ASSY DWG,LOW LEVEL "S" MODULE	EA	REF	ARC-C\1010589	
0400	27099		CAPR,FEED-THRU,FILT,2500PF,500V	EA	6.000	MET\51-719-011	C3 ,C4 C5 ,C6 C7 ,C8
0410	27039		CAPR,CHIP,CER,1000pF,10%,50V	EA	12.000	ATC\700B102MCA50X	C11 ,C12 C13 ,C14 C15 ,C16 C18 ,C19 C20 ,C23 C24 ,C25
0420	27024		CAPR,CHIP,5.1pF,0.5%,500V	EA	1.000	DIL\C17AH5R1D500NT	C22
1500	41243		CONN,COAX,BULKHD JACK,SMA,(F)	EA	2.000	DTA\1321000K82165	J1 ,J2
1800	66052		WIRE,MAGNET,SOLDERABLE,28 AWG,GRN	EA	1.000		L1
1810	1007507-102	-	INDUCTOR,AIR WOUND,.050ID,34GA,5T	EA	4.000	ARC-A\1007507	L2 ,L3 L4 ,L5
2500	1000034-183	BJ	XSTR,RF,LOW NOISE,GaAsFET	EA	1.000	ARC-A\1000034	Q1
2510	1000034-184	BJ	XSTR,RF,MED PWR,GaAsFET	EA	1.000	ARC-A\1000034	Q2
2520	1000034-185	BJ	XSTR,RF,MED PWR,GaAsFET	EA	1.000	ARC-A\1000034	Q3
2700	55649-13R0J		RES,FXD,CHIP,13,5%,1W	EA	1.000	D-K\P13XCT-ND	R1
2710	55511-2200J		RES,FXD,CARBON COMP,220,5%,1/8W	EA	1.000	A-B\BB2215	R2
2720	55511-1800J		RES,FXD,CARBON COMP,180,5%,1/8W	EA	2.000	A-B\BB1815	R3 ,R4
2730	55647-1000J		RES,FXD CHIP,100 OHM,1/8W,5%	EA	2.000	D-K\P100-ECT-ND	R5 ,R6
3700	25069		ATTEN,FXD,2dB,1W,70 MIL PKG	EA	1.000	MIN\PAT-2	U1
5000	1010590-101	-	PWB,LOW LEVEL "S" MODULE	EA	1.000	ARC-B\1010590	1
5010	1010548-101	-	HSG,LOW LEVEL "S" MODULE	EA	1.000	ARC-D\1010548	2
5020	1010757-101	-	COVER,LOW LEVEL 1W AMP,S MODULE	EA	1.000	ARC-B\1010757	3
5030	11145		SCREW,MACH,FIL HD,SLOTTED,0-80 X .25	EA	6.000		4

BILL NO: 1010589-501 REV: B U/M: EA DRAWING NO: ARC-C\1010589
PWB ASSY,LOW LEVEL "S" MODULE

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
5050	11010		SCREW,MACH,PAN HD,CROSS-REC,S/S,4-40 X .25	EA	24.000	\MS51957-13	6
5060	12047		WASH,LOCK,SPLIT,S/S,#4	EA	24.000	\MS35338-135	7
5070	12010		WASH,FLAT,S/S,#4,.250 OD X .125 ID X .022 THK	EA	10.000	\MS15795-803	8
5090	66054		WIRE,MAGNET,SOLDERABLE,28 AWG,RED	IN	A/R		10
5100	1000643-612	C	CORE,FERRITE,TOROID,3E2A	EA	10.000	ARC\1000643	11
5120	77066		ADH,RTV,SELF-LVL,CLEAR	EA	A/R	G-E\GE118	13
5130	1000643-401	C	CORE,FERRITE,BEAD	EA	1.000	ARC\1000643	14
5140	69101		LUG,SOLDER,BENT TONGUE,3/4 L,3/8 OD,1/4 STUD	EA	1.000	HHS\1496	15
5160	69429		SPACER,RND,M-F,A,1/4 OD x .625 L x 4-40	EA	6.000	RAF\4036-440-A	17
5170	1011381-101	-	SPACER,PWB	EA	3.000	ARC-B\1011381	18

BILL NO: 1008806-501 REV: C U/M: EA DRAWING NO:
HARNESS ASSY,1 WATT AMP

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1010749	B	SCHEM DIAG,BIAS CTRL	EA	REF	ARC-B\1010749	
0020	1010458	B	WIRE LIST,MODEL 100S1G4,1 WATT AMP	EA	REF	ARC-A\1010458	
2200	41076		CONN,PLUG,10 PIN,(F)	EA	1.000	PNT\CT156F22-10-T	P1
2210	41061		CONN,THRU COVER,10 PIN	EA	1.000	PNT\TC156F-10-L	P1
5000	66025		WIRE,TFE,22 AWG,STRANDED,TYPE E,BLK	IN	A/R		
5000	66030		WIRE,TFE,22 AWG,STRANDED,TYPE E,GRN	IN	A/R		
5000	66031		WIRE,TFE,22 AWG,STRANDED,TYPE E,BLU	IN	A/R		

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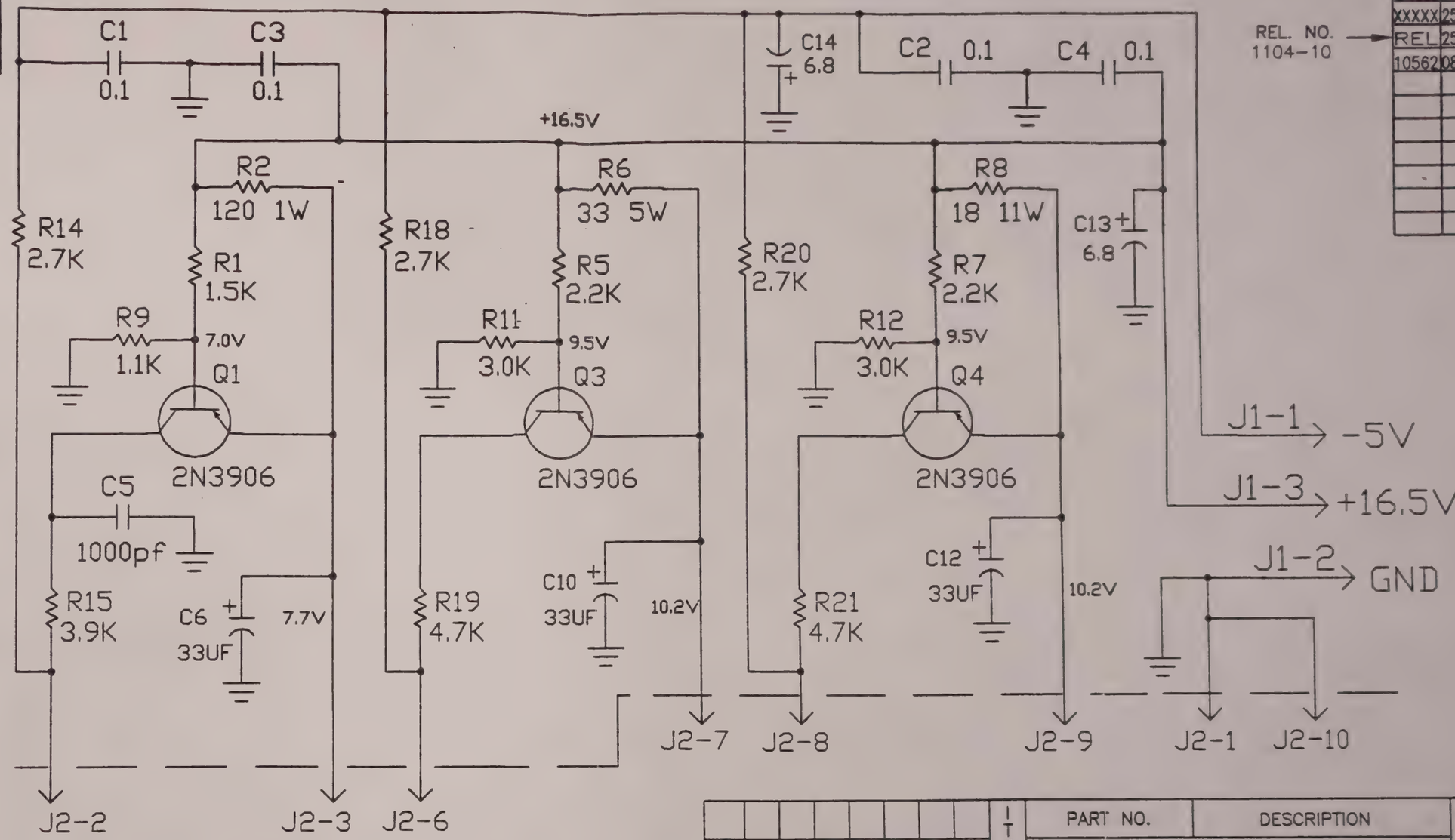
THIS DOCUMENT IS THE PROPERTY OF AMPLIFIER RESEARCH AND THE IDEAS CONTAINED HEREIN, SHALL BE MAINTAINED IN STRICT CONFIDENCE, AND NOT DISCLOSED, COPIED OR USED FOR MANUFACTURING OR SALE OF ANY PRODUCT WITHOUT PRIOR WRITTEN CONSENT OF AMPLIFIER RESEARCH.

ECN	DATE	REV
XXXXX	25OCT99	1
REL	25OCT99	–
10562	08JUN00	A

REL. NO. 1104-10



NOTES:

1.0 UNLESS OTHERWISE INDICATED, ALL RESISTORS ARE IN OHMS, 1/4 WATT, AND 5% TOLERANCE.

2.0 ALL CAPACITORS ARE IN MICROFARADS, AND ARE 50 VOLTS,UNLESS INDICATED.

REFERENCE DESIGNATION TABLE		
LAST DESIGNATION USED		
C14	Q4	R21
DESIGNATIONS NOT USED		
C7,8,9,11	Q2	R3,4,10,13,16,17

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

1S1G4
USED ON MODEL

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015

ANGULAR DIMENSIONS 1/2°

DRAWN J.H.REED DATE 25 OCT 99
CHKD J.H.REED DATE 16 DEC 99
MECH J.MAGINN DATE 17 DEC 99
ELEC J.ALDERFER DATE 16 DEC 99

AMPLIFIER RESEARCH

SCHEMATIC
BIAS CONTROL

DWG. NO. 1010902

SCALE NONE | SHEET 1 OF 1 | REV. A

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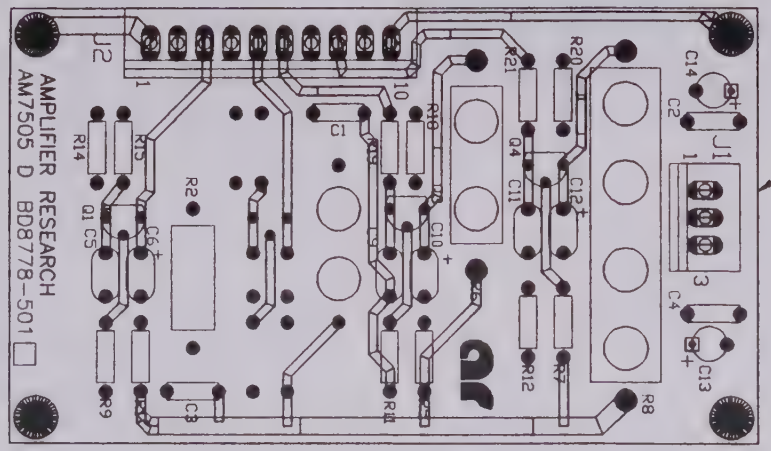
REL. NO. 1104-10

ECN	DATE	REV
100007	21OCT99	1
REL	16DEC99	–
105338	2MAY00	▲



FOR BOM, SEE 1010748-501

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL (60A75, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.05	±.015

ANGULAR DIMENSIONS ±1°

1S1G4
USED ON MODEL

DRAWN J.H.REED DATE 21 OCT 99
CHKD J.H.REED DATE 16 DEC 99
MECH J.MAGINN DATE 02 DEC 99
ELEC J.ALDERFER DATE 16 DEC 99

AMPLIFIER RESEARCH

PWB,ASSY
BIAS CONTROL BD.

DWG. NO. 1010748

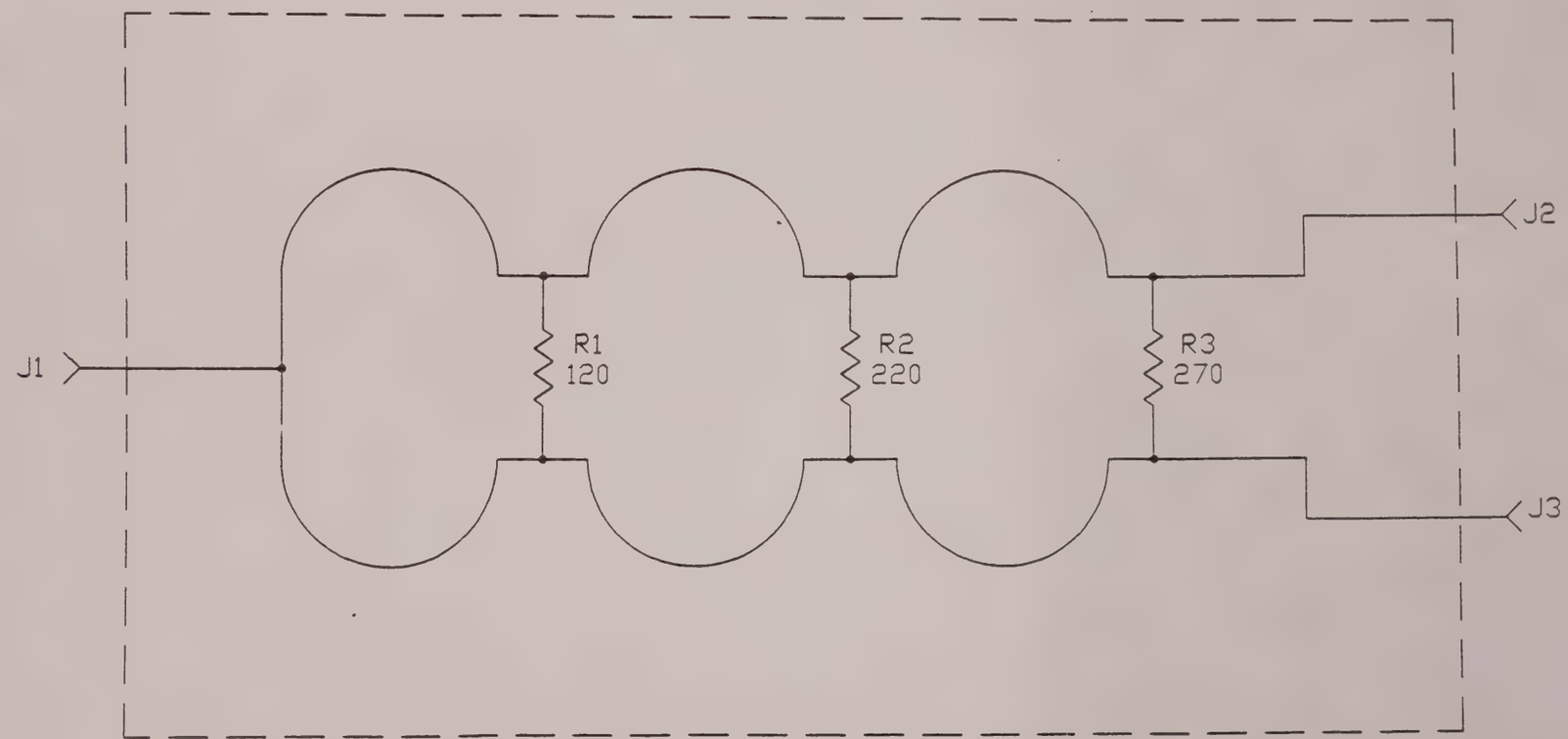
SCALE NONE | SHEET 1 OF 1 | REV. A

BILL NO: 1010748-501 REV: B U/M: EA DRAWING NO: ARC-C\1010748
PWB ASSY,BIAS CTRL,1W S MODULE

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1010748	A	ASSY DWG,BIAS CTRL,1W S MODULE	EA	REF	ARC-C\1010748	
0020	1010749	B	SCHEM DIAG,BIAS CTRL	EA	REF	ARC-B\1010749	
0400	27236		CAPR,FXD,DIP SPACED CER,.1UF,50VDC	EA	4.000	AVX\MD015C104MAA	C1 ,C2 C3 ,C4
0410	27179		CAPR,CER,1000pF,1000V,10%,CHAR Z5F	EA	3.000	NIC\NCD102K1KVY5F	C5 ,C9 C11
0420	27051		CAPR,TANT,33UF,35VDC,EPOXY	EA	3.000	AVX\TAP336K035HSB	C6 ,C10 C12
0430	27055		CAPR,TANT,6.8UF,50V	EA	2.000	MAL\TDC685K050NLF	C13 ,C14
1500	41082		CONN,STR,3 PIN	EA	1.000	PNT\MLSS156-3	J1
1510	41084		CONN,LOCKING HEADER,STR,10 PIN,SQR POSTS	EA	1.000	PNT\MLSS156-10-L	J2
2500	2N3906		XSTR,SWNG,PNP,40V,0.2A,1W	EA	3.000	ARE\2N3906	Q1 ,Q3 Q4
2700	55612-1501J		RES,FXD,METAL FILM,1.5K,5%,1/4-1/2W	EA	1.000	TRW\GP55-1501+/-5%	R1
2730	55514-1200J		RES,FXD,CARBON COMP,120,5%,1W	EA	1.000	A-B\GB1215	R2
2740	55612-2201J		RES,FXD,METAL FILM,2.2K,5%,1/4-1/2W	EA	2.000	TRW\GP55-2201+/-5%	R5 ,R7
2750	55515-33R0J		RES,FXD,CARBON COMP,33,5%,2W	EA	1.000	A-B\HB3305	R6
2760	55724-18R0J		RES,FXD,WW,18,5%,11W	EA	1.000	OHM\90J18R	R8
2770	55612-1101J		RES,FXD,METAL FILM,1.1K,5%,1/4-1/2W	EA	1.000	TRW\GP55-1101+/-5%	R9
2780	55612-3001F		RES,FXD,PRECISION,3K,1%,1/4W,CHAR.D	EA	2.000	IRC\RN55D3001F	R11 ,R12
2800	55612-3901J		RES,FXD,METAL FILM,3.9K,5%,1/4-1/2W	EA	2.000	TRW\GP55-3901+/-5%	R14 ,R15
2810	55612-2701J		RES,FXD,METAL FILM,2.7K,5%,1/4-1/2W	EA	2.000	TRW\GP55-2701+/-5%	R18 ,R20
2820	55612-4701J		RES,FXD,METAL FILM,4.7K,5%,1/4-1/2W	EA	2.000	TRW\GP55-4701+/-5%	R19 ,R21
5000	1007505-101	D	PWB,BIAS CTRL,1 WATT AMP	EA	1.000	ARC-B\1007505	1

REL. 1154-02

ECN	DATE	REV
XXXX	17MAR97	1
REL	02MAY97	–



ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015

50S1G4
USED ON

DRAWN J.H.REED
DATE 17 MAR 97
CHKD J.H.REED
DATE 02 MAY 97
MECH
DATE
ELEC

AMPLIFIER RESEARCH

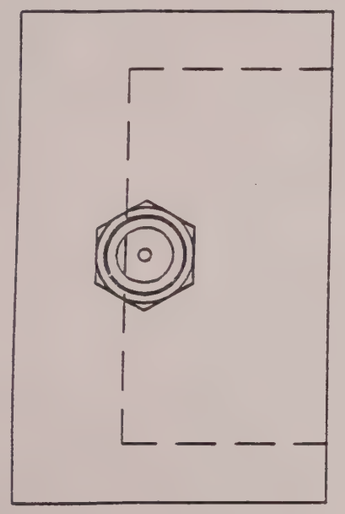
SCHEMATIC
2 WAY SPLITTER

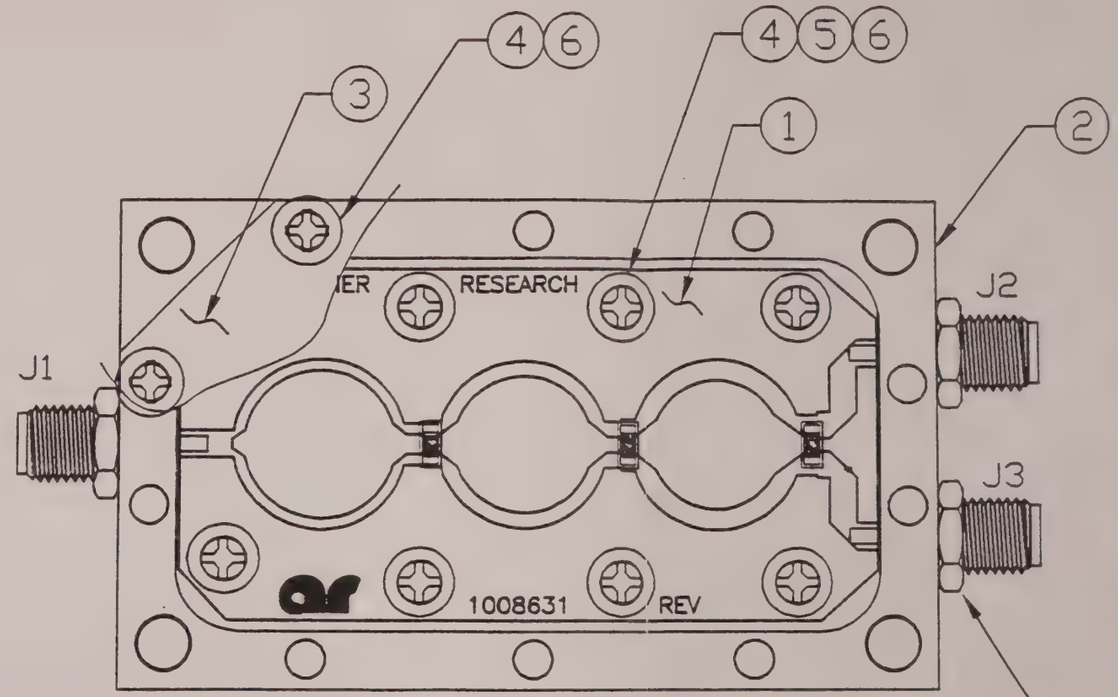
DWG. NO. 1008632

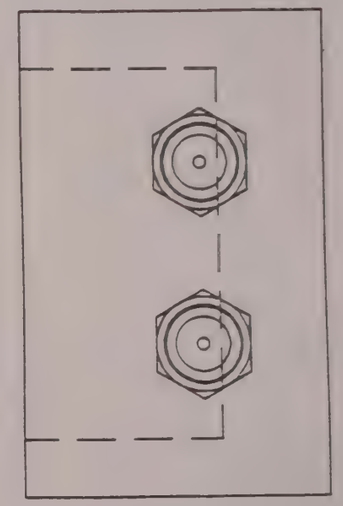
SCALE | SHEET | OF | REV.

ECN	DATE	REV
XXXX	14MAR97	1
REL	20NOV97	—

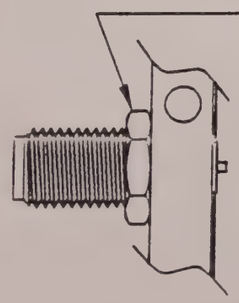
REL NO 1154-07







DETAIL "A"



TRIM TEFLON OF PARTS J1,J2 AND J3 FLUSH WITH CONNECTOR BODY.
CUT CENTER PIN TO 0.075"(IN)
INSTALL CONNECTOR FLUSH WITH INNER HOUSING WALL. TIGHTEN LOCKING NUT "A" SECURELY.
(DO NOT USE SUPPLIED WASHER)

FOR BOM SEE 1008630-501

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015
ANGULAR DIMENSIONS 1/2		

50S1G4
USED ON MODEL

DRAWN J.H.REED DATE 14 MAR 97
CHKD J.H.REED DATE 20 NOV 97
MECH J. Maguire DATE 11/21/97
ELEC F. Schick DATE 20 NOV 97

AMPLIFIER RESEARCH

ASSEMBLY
2 WAY SPLITTER

DWG. NO. 1008630

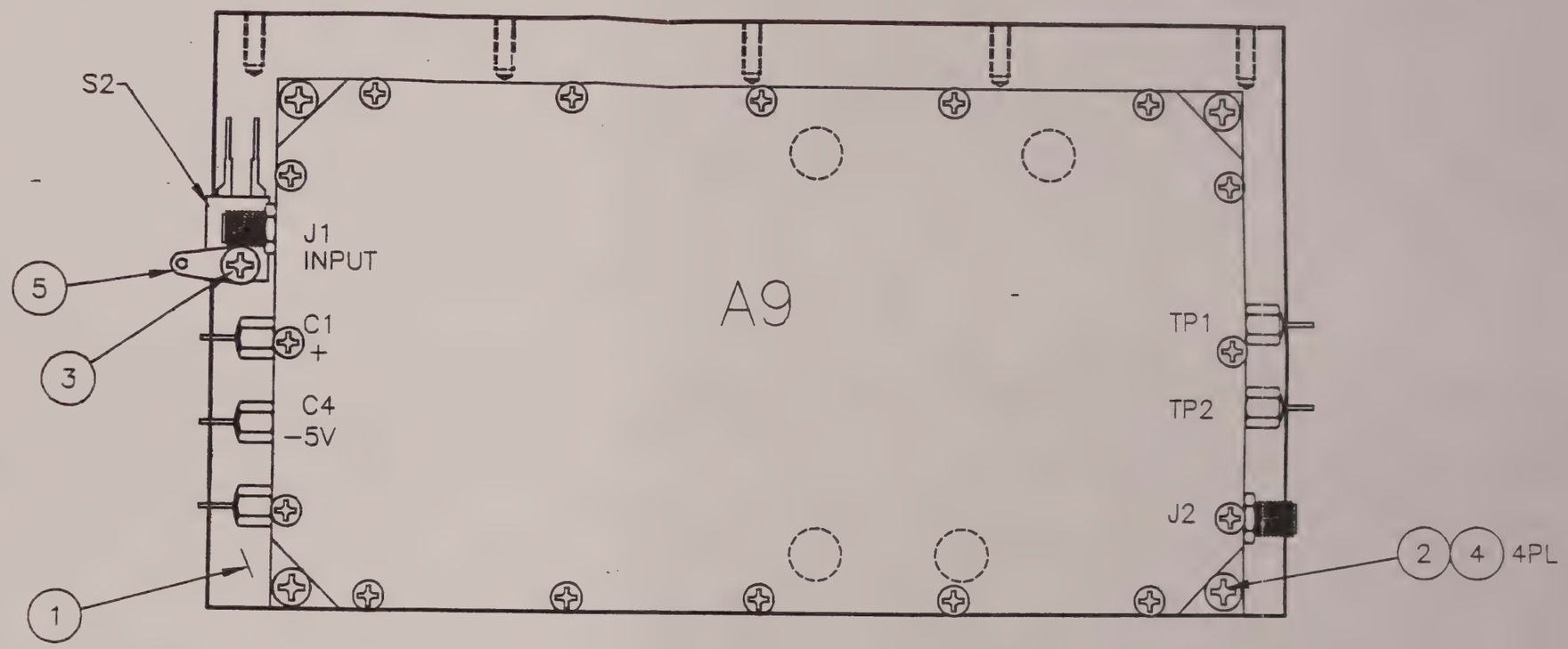
SCALE NONE | SHEET 1 OF 1 | REV. —

BILL NO: 1008630-501 REV: - U/M: EA DRAWING NO: ARC-B\1008630
PWB ASSY,2 WAY SPLITTER

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1008632	-	SCHEM DIAG,2 WAY SPLITTER	EA	REF	ARC-B\1008632	
0020	1008630	-	ASSY DWG,2 WAY SPLITTER	EA	REF	ARC-B\1008630	
1500	41243		CONN,COAX,BULKHD JACK,SMA,(F)	EA	3.000	DTA\1321000K82165	J1 ,J2 J3
2700	55647-1200J		RES,FXD,CHIP,120,5%,1/8W	EA	1.000	D-K\P120-ECT-ND	R1
2710	55647-2200J		RES,FXD,CHIP,220,5%,1/8W	EA	1.000	D-K\P220-ECT-ND	R2
2720	55647-2700J		RES,FXD,CHIP,270,5%,1/8W	EA	1.000	D-K\P270-ECT-ND	R3
5000	1008631-101	-	PWB,2 WAY SPLITTER	EA	1.000	ARC-B\1008631	1
5010	1008635-101	-	HSG,2 WAY SPLITTER	EA	1.000	ARC-B\1008635	2
5020	1008636-101	A	COVER,2 WAY SPLITTER	EA	1.000	ARC-B\1008636	3
5030	11010		SCREW,MACH,PAN HD,CROSS-REC,S/S,4-40 X .25	EA	18.000	\MS51957-13	4
5040	12010		WASH,FLAT,S/S,#4,.250 OD X .125 ID X .022 THK	EA	8.000	\MS15795-803	5
5050	12047		WASH,LOCK,SPLIT,S/S,#4	EA	18.000	\MS35338-135	6

REL #2022-01

ECN	DATE	REV
REL	16AUG99	–
10296	6DEC99	A



FOR BOM SEE 1010571-501

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015

ANGULAR DIMENSIONS 1/2°

50S1G4A
USED ON MODEL

DRAWN G.JACKSON DATE 16 JUN 99
CHKD G.JACKSON DATE 16 JUN 99
MECH J.MAGINN DATE 8/18/99
ELEC F.SCHIRK DATE 17 AUG 99

AMPLIFIER RESEARCH

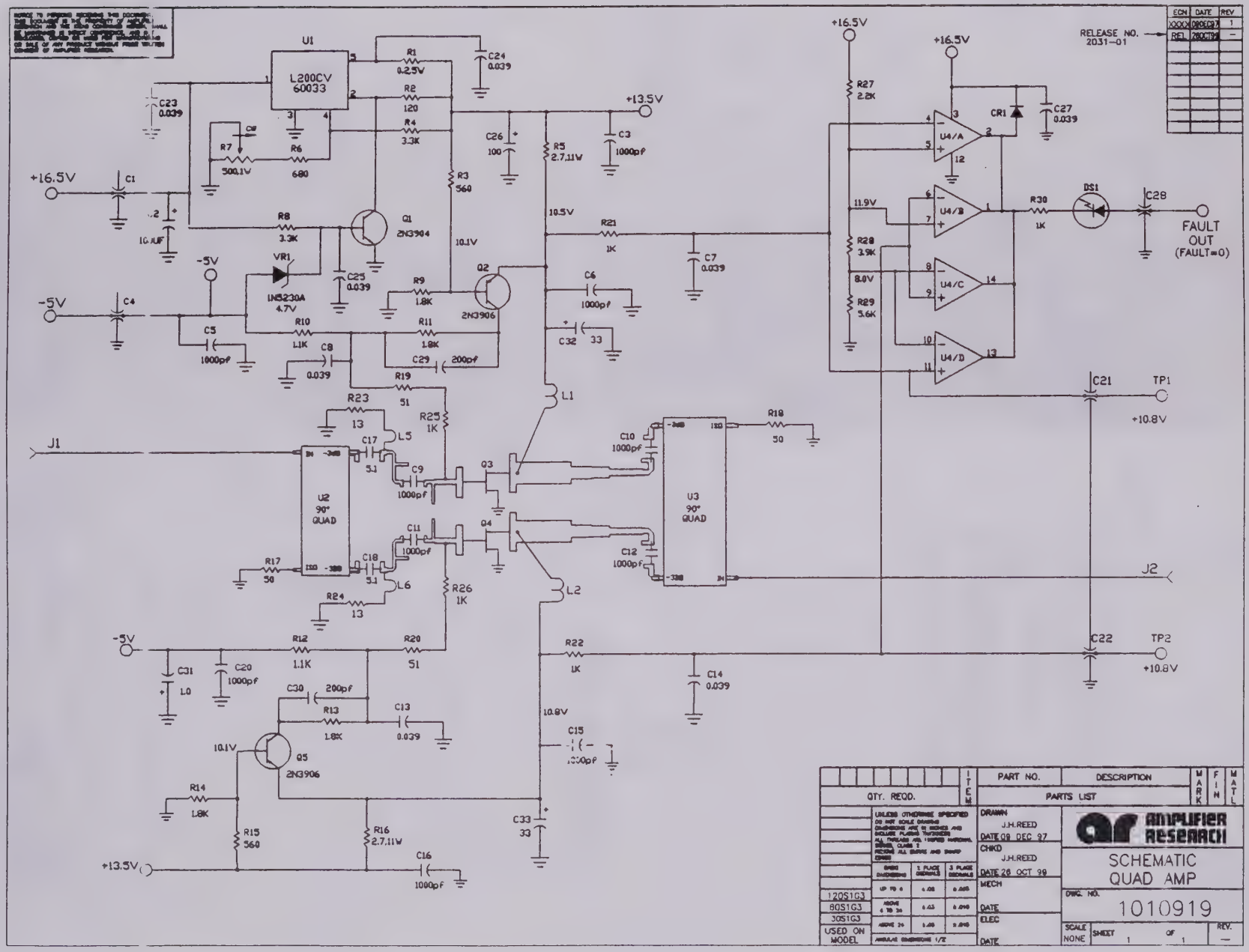
AUX RF LOW LEVEL ASSY

DWG. NO. 1010571

SCALE 1/1 | SHEET 1 OF 1 | REV. A

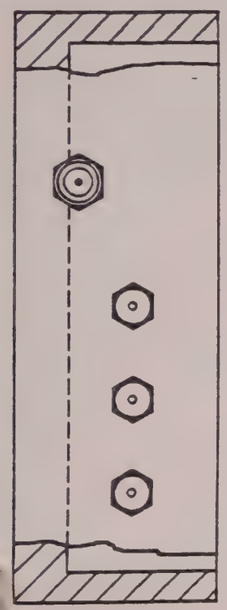
BILL NO: 1010571-501 REV: B U/M: EA DRAWING NO: ARC-B\1010571
AUX RF LOW LEVEL ASSY

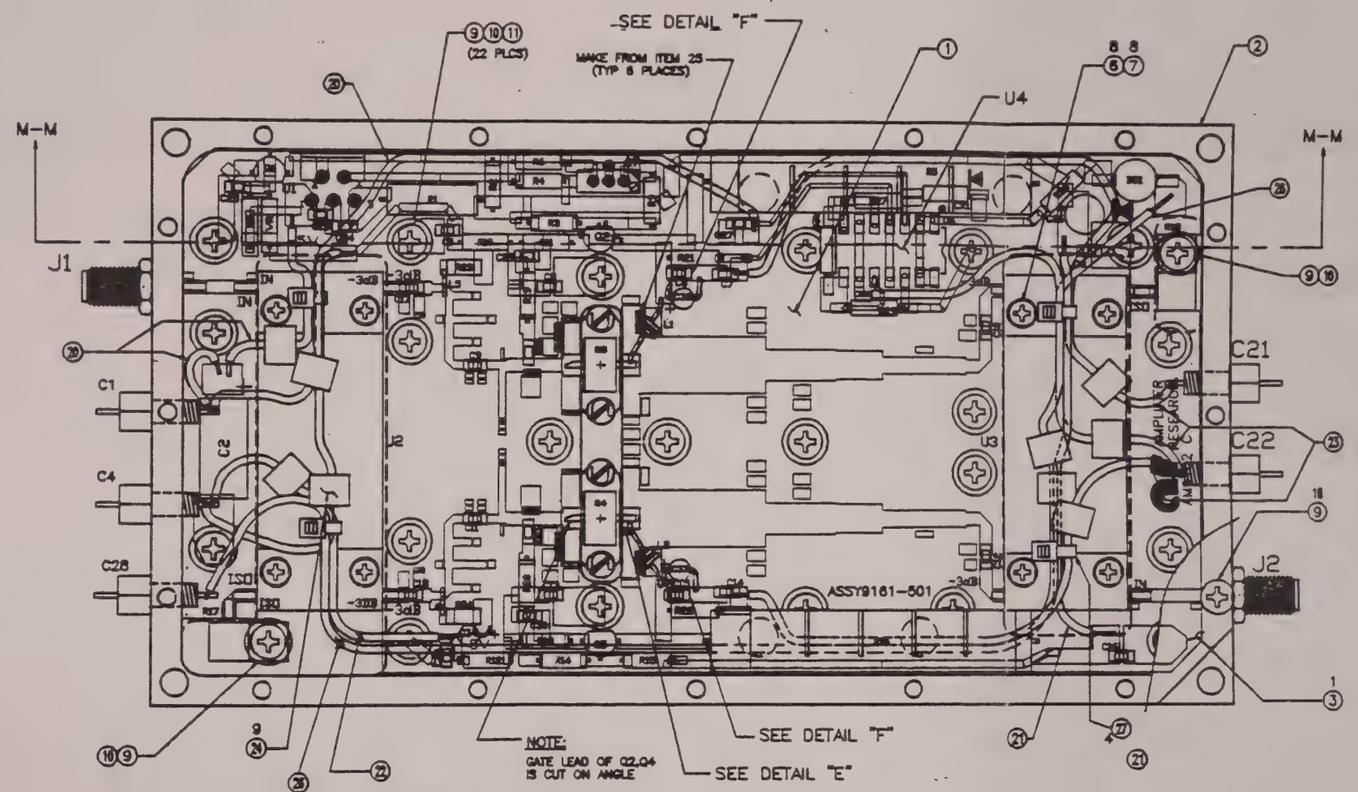
SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1010571	A	ASSY DWG,AUX RF LOW LEVEL	EA	REF	ARC-B\1010571	
0100	1009161-501	J	PWB ASSY,QUAD AMP,100S1G4	EA	1.000	ARC-A\1009161	A9
3100	57062		SW,TEMP SENSING,N.C.,OPEN AT 70C	EA	1.000	AIR\67L070	S2
5000	1009481-101	B	HEATSINK	EA	1.000	ARC-C\1009481	1
5010	11025		SCREW,MACH,PAN HD,CROSS-REC,S/S,6-32 X 1.50	EA	4.000	\MS51957-36	2
5020	11016		SCREW,MACH,PAN HD,CROSS-REC,S/S,6-32 X .38	EA	1.000	\MS51957-28	3
5030	12048		WASH,LOCK,SPLIT,S/S,#6	EA	5.000	\MS35338-136	4
5040	69100		LUG,SHAKEPROOF,BENT,41/64 L,#6 STUD,DUAL HOLE	EA	1.000	HHS\1416-6	5

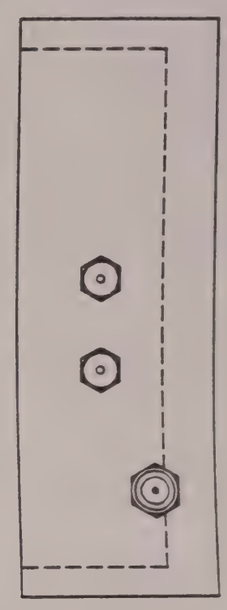

U1
L200CV
60033
+16.5V
-5V
+13.5V
+10.8V
10.5V
10.1V
8.0V
11.9V
VR1
1N5230A
4.7V
Q1
2N3904
Q2
2N3906
Q3
Q4
Q5
2N3906
U2
90°
QUAD
U3
90°
QUAD
U4/A
U4/B
U4/C
U4/D
CR1
DS1
J1
J2
TP1
TP2
FAULT
OUT
(FAULT=0)
L1
L2
L5
L6
R1 0.25V
R2 120
R3 560
R4 3.3K
R5 2.7,11W
R6 680
R7 500,1V
R8 3.3K
R9 1.8K
R10 1.1K
R11 1.8K
R12 1.1K
R13 1.8K
R14 1.8K
R15 560
R16 2.7,11W
R17 50
R18 50
R19 51
R20 51
R21 1K
R22 1K
R23 13
R24 13
R25 1K
R26 1K
R27 2.2K
R28 3.9K
R29 3.6K
R30 1K
C1
C2 10.4UF
C3 1000pf
C4
C5 1000pf
C6 1000pf
C7 0.039
C8 0.039
C9 1000pf
C10 1000pf
C11 1000pf
C12 1000pf
C13 0.039
C14 0.039
C15 1000pf
C16 1000pf
C17 5.1
C18 5.1
C20 1000pf
C21
C22
C23 0.039
C24 0.039
C25 0.039
C26 100
C27 0.039
C28
C29 200pf
C30 200pf
C31 1.0
C32 33
C33 33
RELEASE NO. 2031-01
ECN DATE REV
XXXX 090CT97 1
REL 280CT99 —
PART NO. DESCRIPTION
PARTS LIST
QTY. REQD.
ITEM
MARK FIN MATL
DRAWN J.H.REED DATE 09 DEC 97
CHKD J.H.REED DATE 26 OCT 99
MECH DATE
ELEC DATE
AMPLIFIER RESEARCH
SCHEMATIC
QUAD AMP
DWG. NO. 1010919
SCALE NONE
SHEET 1 OF 1
REV. —
120S1G3
60S1G3
30S1G3
USED ON MODEL

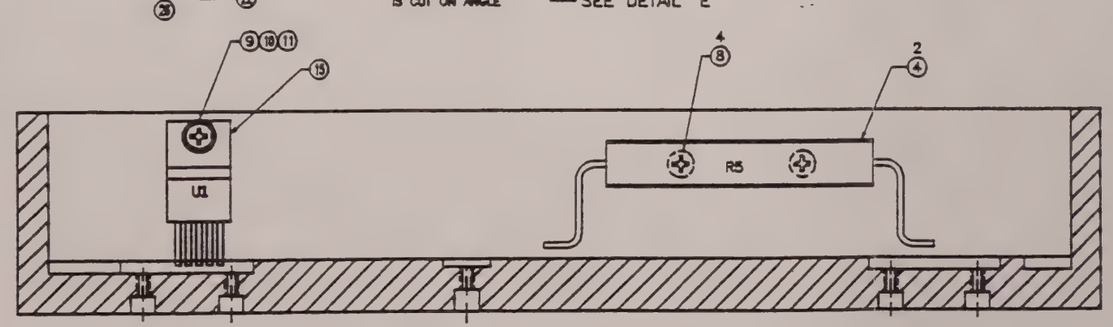
ANY PRODUCT WITHOUT PRIOR WRITTEN ... AMPLITECH RESEARCH.

REL NO 2031-01	ECN	DATE	REV
	–	18OCT99	1
	REL1	29OCT99	–
	10343	21DEC99	A

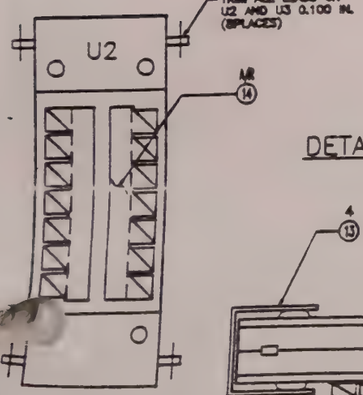






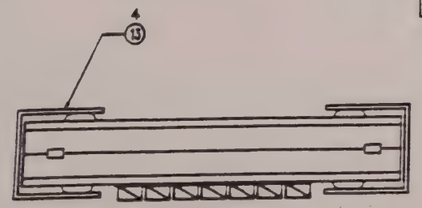


SECTION M – M



BOTTOM VIEW OF U2 & U3

DETAIL "A"

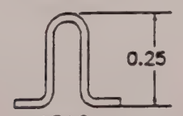


SIDE VIEW OF U2 & U3

DETAIL "B"

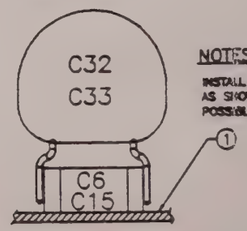
TRIM TEFLON OF PARTS J1, AND J2 FLUSH WITH CONNECTOR BODY. CUT CENTER PIN TO 0.075"(IN) INSTALL CONNECTOR FLUSH WITH INNER HOUSING WALL. TIGHTEN LOCKING NUT "A" SECURELY. (DO NOT USE SUPPLIED WASHER)

DETAIL "C"
NOT TO SCALE



L5,L6

DETAIL "F"



NOTES:
INSTALL TANT. CAP ON TOP OF CHIP CAPS AS SHOWN. KEEPING LEADS AS SHORT AS POSSIBLE. (SIDE VIEW)

DETAIL "D"
NOT TO SCALE

NOTES:

1.0 INSTALL PWB INTO HOUSING. CENTER THE CUTOUT FOR THE FET'S OVER THE 2–56 FET MOUNTING SCREW HOLES.

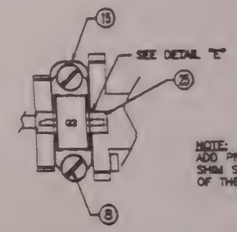
2.0 TIGHTEN ALL MOUNTING SCREWS FOR PWB BEFORE BEGINNING INSTALLATION OF COMPONENTS.

3.0 INSTALL ALL COMPONENTS INTO HOUSING BEFORE FET INSTALLATION. THIS MUST BE DONE LAST.

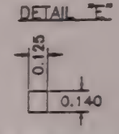
CAUTION

4.0 THE FET INSTALLATION MUST BE DONE AT A STATIC APPROVED WORK STATION. PERSONS HANDLING AND INSTALLING THE FET'S MUST BE FAMILIAR WITH GaAs FET HANDLING PROCEDURES. THE GaAs FET CAN BE DESTROYED, ELECTRICALLY AND MECHANICALLY.

5.0 DO NOT PUSH THE GATE OR DRAIN LEADS DOWN TO THE P.C. BOARD WHEN INSTALLING THE FET. USE SOLDER TO FILL THE AREA BETWEEN THE LEAD AND THE P.C.BOARD.

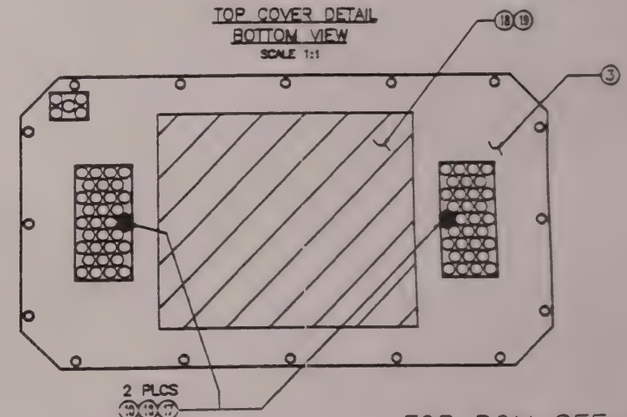


DETAIL "E"



NOTE:
ADD PIECE OF ITEM 25 (0.003 THK BRASS SHIM STOCK) TINNED ON BOTH SIDES TO TOP OF THE GATE AND DRAIN LEADS OF Q3,Q4.

TOP COVER DETAIL
BOTTOM VIEW
SCALE 1:1



FOR BOM SEE: 1010886-501

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MAT'L
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND TOLERANCES ARE: 3 PLACE DECIMALS ± .005, 2 PLACE DECIMALS ± .01, ANGLES ± 1°

	3 PLACE DECIMALS	2 PLACE DECIMALS
UP TO 6	0.005	0.010
OVER 6 TO 24	0.010	0.020
OVER 24	0.030	0.060

ANGULAR TOLERANCE 1/2°

120S1Q3	
30S1Q3	
60S1Q3	
USED ON MODEL	

DRAWN	J.REED	DATE 18 OCT 99
CHKD	J.REED	DATE 19 OCT 99
MECH	J.MAGINN	DATE 27 OCT 99
ELEC	F.SCHIRK	DATE 27 OCT 99

ASSEMBLY QUAD AMP

DWG NO. 1010886

SCALE NONE | SHEET 1 OF 1 | REV A

BILL NO: 1010886-501 REV: C U/M: EA DRAWING NO: ARC-A\1010886
PWB ASSY,QUAD AMP

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1010919	-	SCHEMATIC,QUAD AMP	EA	REF	ARC-C\1010919	
0020	1010886	A	ASSY DWG,PWB,QUAD AMP	EA	REF	ARC-A\1010886	
5000	1009161-501	J	PWB ASSY,QUAD AMP,100S1G4	EA	1.000	ARC-A\1009161	
5240	77144	-	SHIM,BRASS,6.00X.003 THK (ROLL 100")	IN	A/R	MSS\00051037	25

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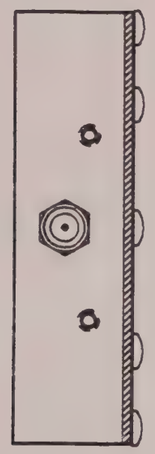
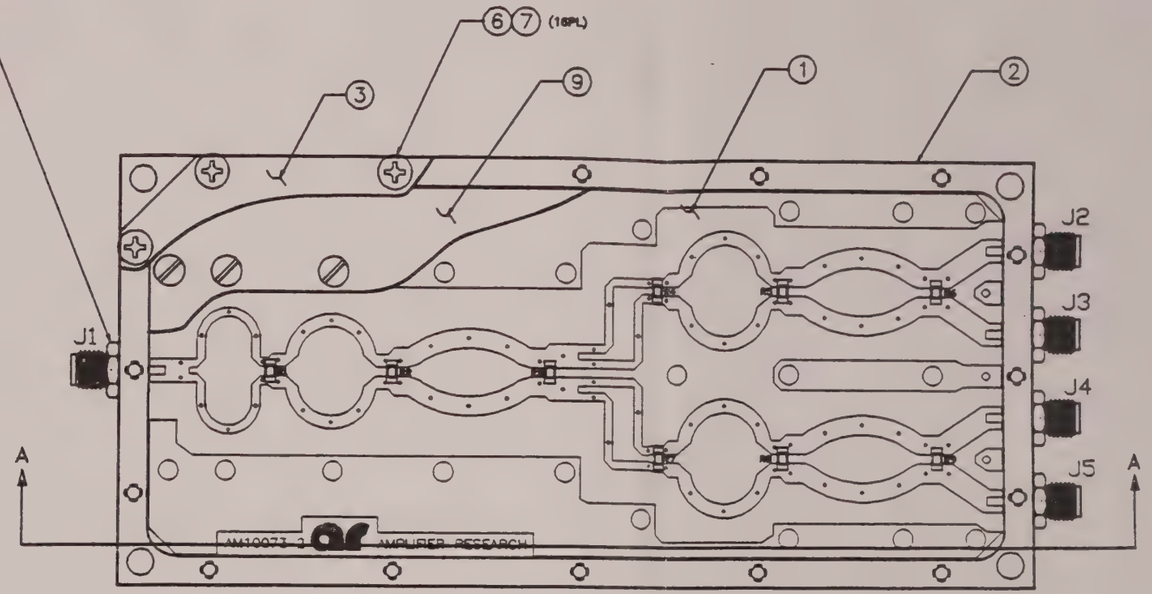
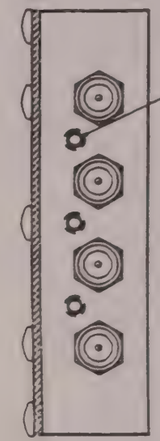
LOANED IN STRICT CONFIDENCE, AND NOT
USED, COPIED OR USED FOR MANUFACTURE,
IN OF ANY PRODUCT WITHOUT PRIOR WRITTEN
OF AMPLIFIER RESEARCH.

ECN	DATE	REV
XXXXX	4NOV96	1
XXXXX	11JUN97	2
XXXXX	21JUN99	3
XXXXX	8JUNE00	4
RELEASE NO. 1196-03	15JUN01	-
11223	1JUN06	A

SEE DETAIL "A" TYP 5 PLCS







5 PLCS
10

DETAIL "A"

TRIM TEFLON OF PARTS J1,J2,J3,J4, AND J5, FLUSH WITH CONNECTOR BODY. CUT CENTER PIN TO 0.075"(IN) INSTALL CONNECTOR FLUSH WITH INNER HOUSING WALL. TIGHTEN LOCKING NUT SECURELY. (DO NOT USE SUPPLIED WASHER)

PLACE 1.0 X 1.0 FOAM PIECE IN THIS AREA, APPROX. CENTER

11 7 TYP 21 PLCS

12

13

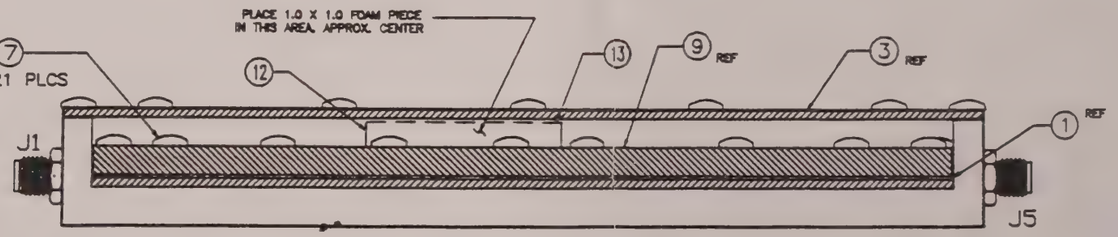
9 REF

3 REF

1 REF

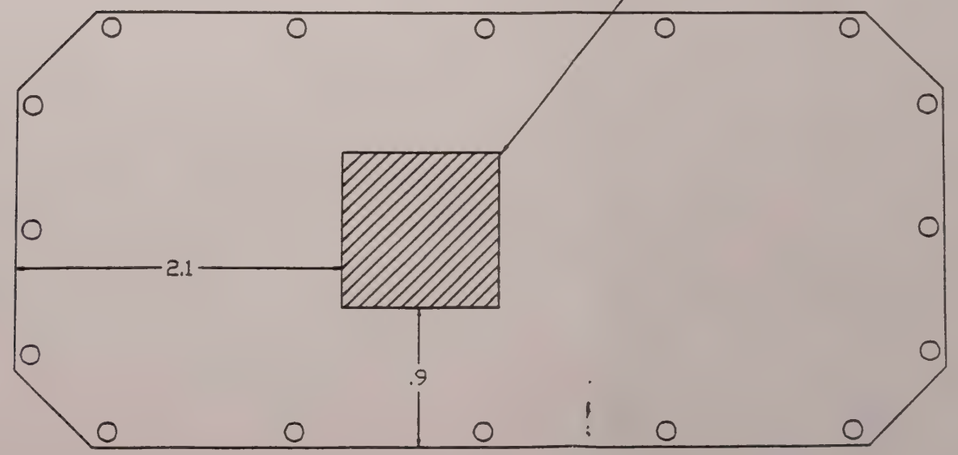
J1

J5



VIEW A – A

REF ITEM 12



COVER BOTTOM VIEW

NOTES:

1. INSTALL CONNECTORS (J1 THRU J5) ONTO HOUSING (ITEM 2).
2. INSTALL RESISTORS (R1 THRU R9) TO PWB (ITEM 1), THEN INSTALL PWB INTO HOUSING (ITEM 2) TEMPORAILY USING MTG HARDWARE (ITEMS 6 AND 7). CONN END'S ONLY.
3. SOLDER CENTER PINS OF CONECTORS (J1 THRU J5) TO PWB. REMOVE MTG HARDWARE AFTER SOLDERING IS COMPLETE.
4. INSTALL INNER LID (ITEM 9) INTO HOUSING USING MTG HARDWARE (ITEMS 7, & 11).
5. INSTALL SET SCREWS (ITEM 10), INTO HOUSING 5 PLACES, TIGHTEN SECURELY.
6. INSTALL FOAM PIECE (ITEM 12), APPROX. WHERE SHOWN. APPLY RTV SEALANT P/N 77065 TO FOAM, ITEM 12. SECURE TO COVER LOCATED APPROX. AS SHOWN. CURE AT AMBIENT FOR 24 HRS.
7. PUT ALL MTG. HARDWARE (ITEMS 6 AND 7) IN TOP COVER. COVER WILL NOT BE REMOVED ONCE IT IS PLACED ON HOUSING.

FOR BOM, SEE 1010072-501

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIND	MATL
			PARTS LIST			

UNLESS OTHERWISE SPECIFIED DO NOT SCALE DRAWING DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS ALL SURFACES ARE LATEX FINISHED, GRADE 1 REMOVE ALL BURRS AND SHARP EDGES

DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.03	±.005
OVER 6 TO 24	±.05	±.010
OVER 24	±.10	±.020
ANGLES	±2°	±1°

.XXXX ±.0001 G4

DRAWN J.J.REED DATE 04 NOV 98
CHKD J.J.REED DATE 28 MAY 99
MFGR J.MACHEN DATE 15 JUNE 99
ENGR P.SCHENK

AMPLIFIER RESEARCH

ASSEMBLY DRAWING
4 WAY SPLITTER

DWG. NO. 1010072

SCALE

SHEET

BILL NO: 1010072-501 REV: A U/M: EA DRAWING NO: ARC-D\1010072
PWB ASSY,4 WAY SPLITTER #3

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1010072	A	ASSY DWG,4 WAY SPLITTER #3	EA	REF	ARC-D\1010072	
0020	1010074	-	SCHEM DIAG,4 WAY SPLITTER #3	EA	REF	ARC-B\1010074	
1500	41243		CONN,COAX,BULKHD JACK,SMA,(F)	EA	5.000	DTA\1321000K82165	J1 ,J2 J3 ,J4 J5
2700	55651-1200J		RES,FXD,CHIP,120,5%,1/4W	EA	3.000	D-K\P120VCT-ND	R1 ,R4 R7
2710	55651-2200J		RES,FXD,CHIP,220,5%,1/4W	EA	3.000	D-K\P220VCT-ND	R2 ,R5 R8
2720	55651-2700J		RES,FXD,CHIP,270,5%,1/4W	EA	3.000	D-K\P270VCT-ND	R3 ,R6 R9
5000	1010073-101	A	PWB,4 WAY SPLITTER #3	EA	1.000	ARC-B\1010073	1
5010	1010075-101	-	HSG,4 WAY SPLITTER #3	EA	1.000	ARC-B\1010075	2
5020	1008122-101	-	COVER,4 WAY SPLITTER	EA	1.000	ARC-B\1008122	3
5040	11010		SCREW,MACH,PAN HD,CROSS-REC,S/S,4-40 X .25	EA	16.000	\MS51957-13	6
5050	12047		WASH,LOCK,SPLIT,S/S,#4	EA	37.000	\MS35338-135	7
5070	1010076-101	-	LID,INNER,4 WAY SPLITTER #3	EA	1.000	ARC-B\1010076	9
5080	11183		SET SCREW,HEX SOCKET,CUP PT,S/S,6-32 X .19	EA	5.000		10
5090	11011		SCREW,MACH,PAN HD,CROSS-REC,S/S,4-40 X .38	EA	21.000	\MS51957-15	11
5100	69332		FOAM,CONDUCTIVE	IN	A/R	MMM\2802	12
5110	77065		SEALANT,RTV,FLUOROSILE	OZ	A/R	G-E\730 RTV	13

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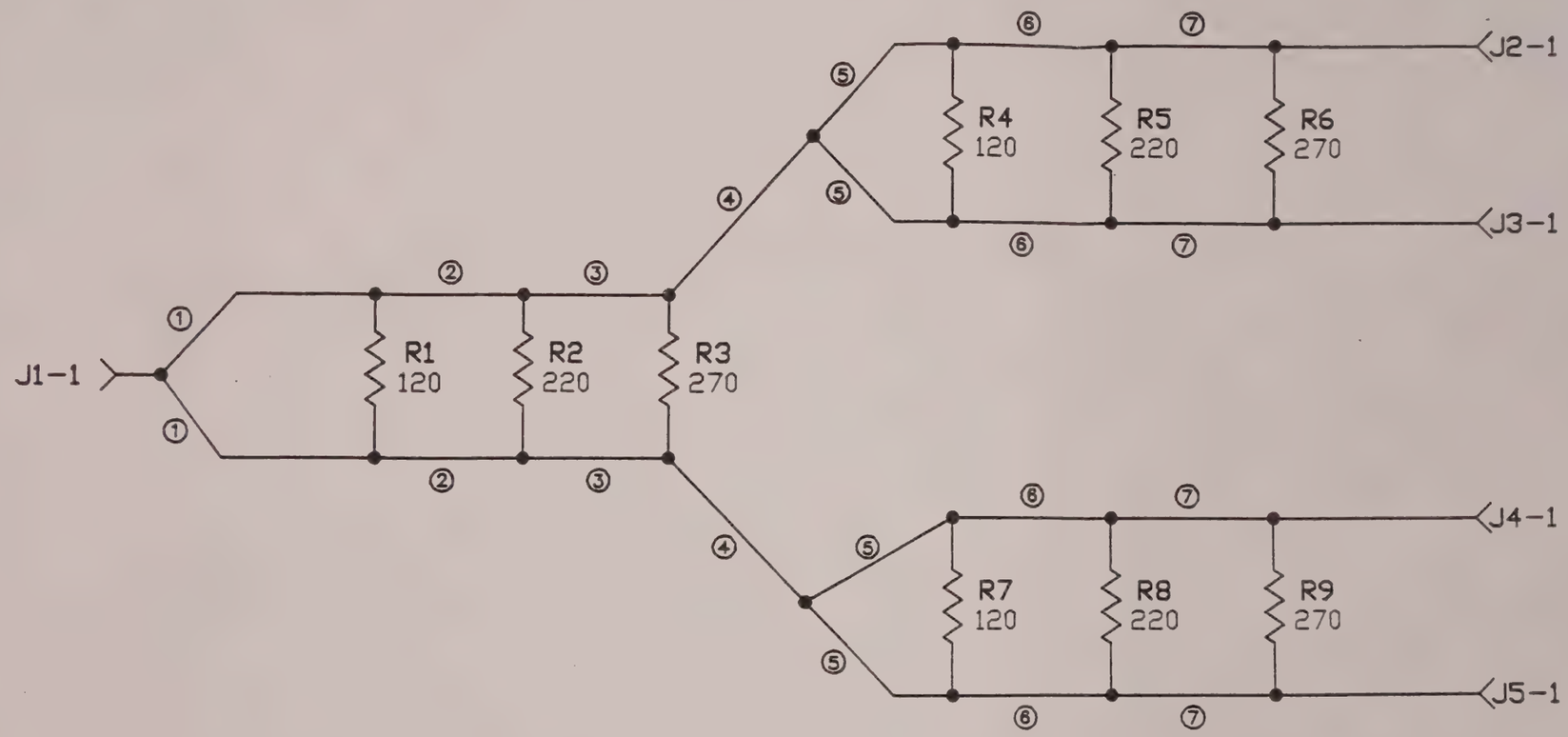
ECN	DATE	REV
XXXX	13NOV98	1
REL	28MAY99	—

REL. NO. 1196-03



ITEM	PART NO.	DESCRIPTION	MARK	FIN	MATL
QTY. REQD.	PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015

ANGULAR DIMENSIONS 1/2°

100S1G4
USED ON MODEL

DRAWN J.H.REED DATE 10 NOV 98
CHKD J.H.REED DATE 28 MAY 99
MECH [signature] DATE 6/10/99
ELEC [signature] DATE 25 Jun 99

AMPLIFIER RESEARCH

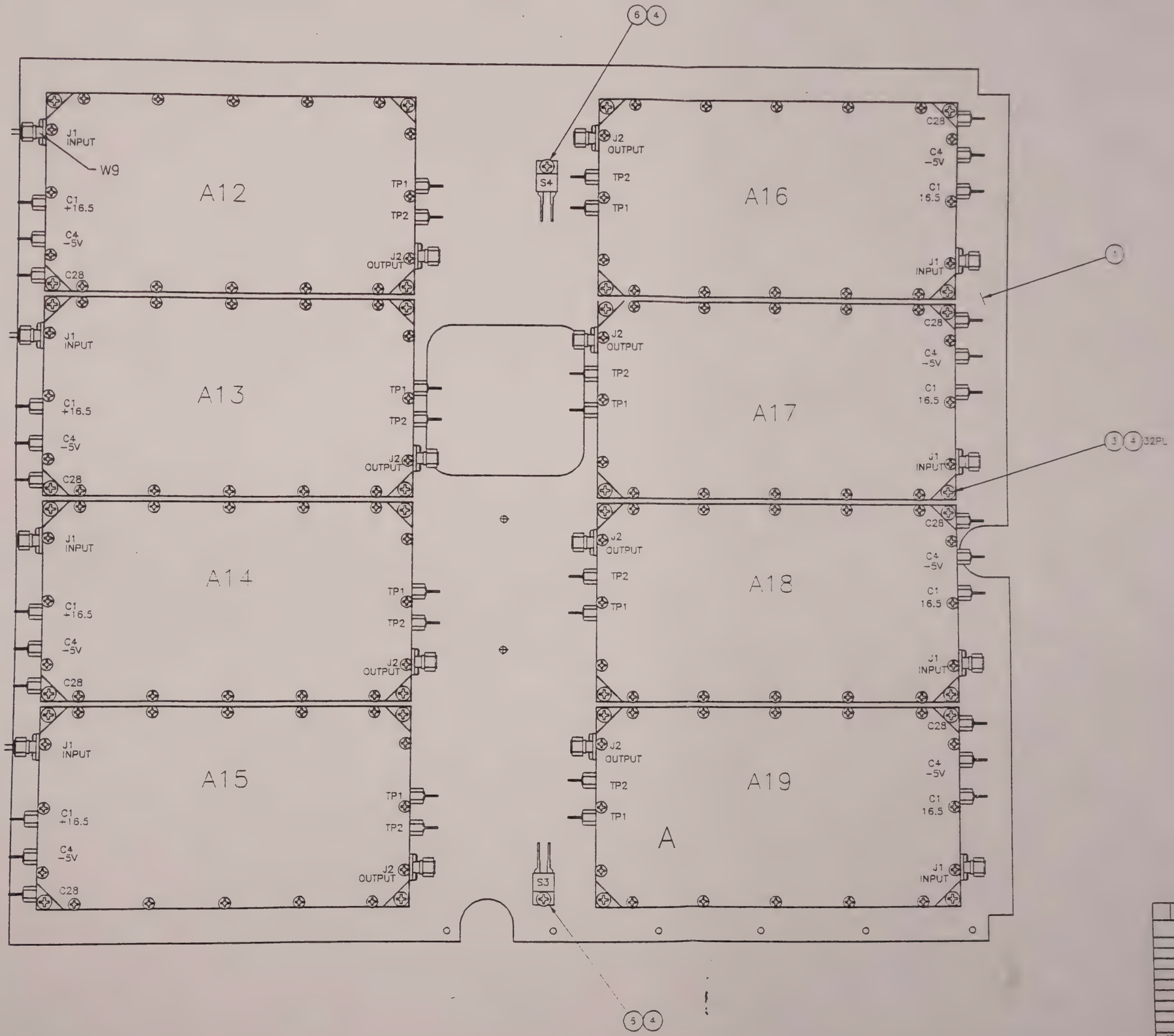
SCHEMATIC 4 WAY SPLITTER #3

DWG. NO. 1010074

SCALE NONE | SHEET 1 OF 1 | REV. —

REV	DATE	ECN

REL #2031-01



FOR BOM SEE 1010885-501

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL VALUES ARE RATED NATIONAL SERIES, CLASS I.
REMOVE ALL BURRS AND SHARP EDGES

MIXED DIMENSIONS	1 PLACE DECIMALS	2 PLACE DECIMALS
UP TO 6	±.03	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.08	±.015
ANGULAR DIMENSIONS ±1°		

DRAWN: S.JACKSON DATE: 9 OCT 89
CHKD: S.JACKSON DATE: 9 OCT 89
MECH: DATE
ELEC: DATE

AMPLIFIER RESEARCH

RF ASSY, FINAL

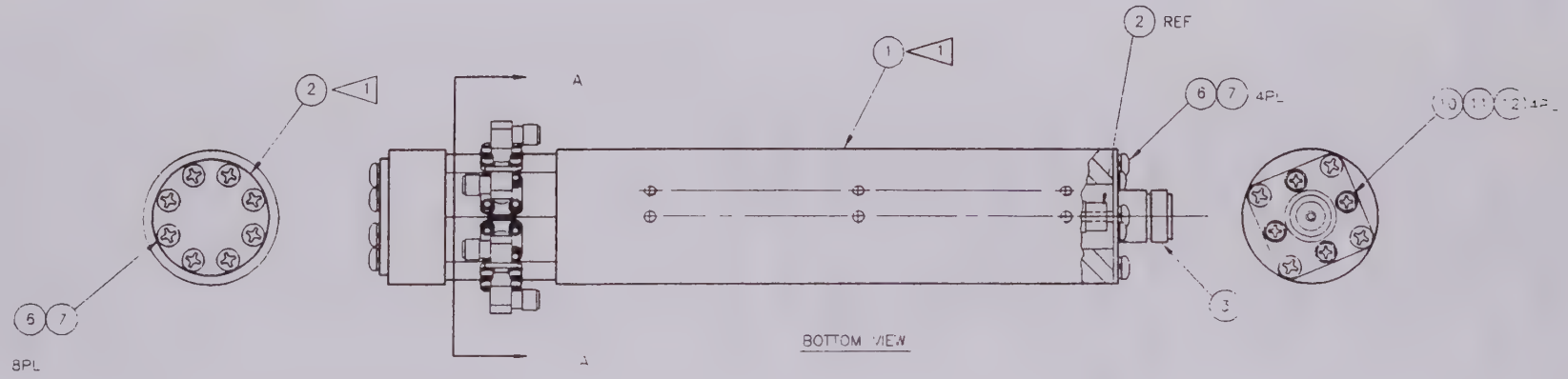
DWG. NO. 1010885

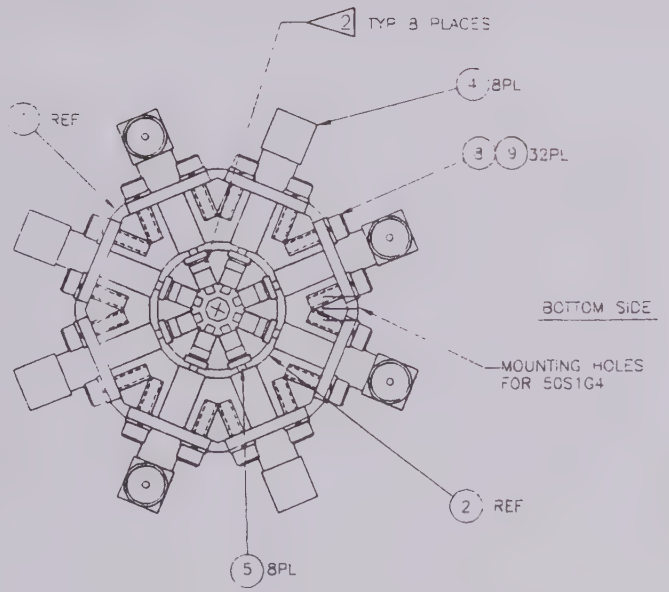
SCALE: SHEET OF REV —

SOS1GJ
USED ON MODEL

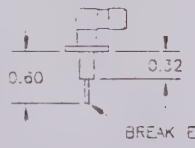
BILL NO: 1010885-501 REV: - U/M: EA DRAWING NO: ARC-D\1010885
RF ASSY,FINAL

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1010552	B	SCHEM DIAG,50S1G4A	EA	REF	ARC-D\1010552	
0020	1010885	-	ASSY DWG,RF FINAL	EA	REF	ARC-D\1010885	
0100	1010886-501	C	PWB ASSY,QUAD AMP	EA	8.000	ARC-A\1010886	A12 ,A13 A14 ,A15 A16 ,A17 A18 ,A19
3100	57062		SW,TEMP SENSING,N.C.,OPEN AT 70C	EA	2.000	AIR\67L070	S3 ,S4
5000	1010570-301	-	HEATSINK	EA	1.000	ARC-D\1010570	1
5020	11025		SCREW,MACH,PAN HD,CROSS-REC,S/S,6-32 X 1.50	EA	24.000	\MS51957-36	3
5030	12048		WASH,LOCK,SPLIT,S/S,#6	EA	26.000	\MS35338-136	4
5050	11016		SCREW,MACH,PAN HD,CROSS-REC,S/S,6-32 X .38	EA	2.000	\MS51957-28	6

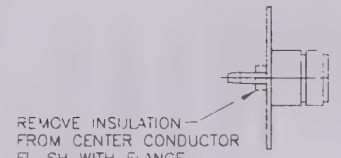




SECTION A–A
SCALE 2=1



MODIFICATION OF P/N 1



MODIFICATION OF P/N 3

NOTES

1. THOROUGHLY DEGREASE ITEMS 1 & 2 BEFORE ASSEMBLY.
2. PRESS ITEM 5 INTO ITEM 2, 8 PLACES, USING ARBOR PRESS WITH SUITABLE TOOL. FLANGE OF ITEM 5 SHOULD BOTTOM IN .140 DIA C'BORE OF ITEM 2. DO NOT DEFORM PIN RECEPTACLE SHELL OR INTERNAL FINGERS.

SEE BOM 1007409-501

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MAT
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 3
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.08	±.015

ANGULAR DIMENSIONS ±2°

DRAWN	C. BICKELMAN
DATE	14 AUG 95
CHKD	C. BICKELMAN
DATE	17 AUG 95
MECH	J. MAGINN
DATE	25 JAN 96
ELEC	J. MACGHAN
DATE	25 JAN 96

AMPLIFIER RESEARCH

COMBINER ASSY, 8 WAY

DWG. NO 1007409

USED ON MODEL: 50S1G4, 10S1G4

SCALE 1/1 | SHEET 1 OF 1 | REV

AMPLIFIER RESEARCH

08:59:45 06 DEC 2000 * * * SINGLE LEVEL BILL OF MATERIAL LISTING * * * REPORT: E0056 PAGE: 1

BILL NO: 1007409-501 REV: C U/M: EA DRAWING NO: ARC-C\1007409
COMBINER ASSY,8 WAY

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1007409	C	ASSY DWG,COMBINER ASSY,8 WAY	EA	REF	ARC-C\1007409	
5000	1007674-101	H	BODY,8 WAY COMBINER	EA	1.000	ARC-D\1007674	1
5010	1007676-101	D	XFMR,STEPPED,8 WAY COMBINER	EA	1.000	ARC-C\1007676	2
5020	1009695-101	A	CONN,MOD	EA	1.000	ARC-B\1009695	3
5030	41221		CONN,SMA,R.A.,FLANGE MTG,RECEPT (F)	EA	8.000	MOS\2054-1201-02	4
5040	41230		RECEPT,PIN,.048-.064 DIA X.200LG	EA	8.000	MLX\	5
5050	11015		SCREW,MACH,PAN HD,CROSS-REC,S/S,6-32 X .31	EA	12.000	\MS51957-27	6
5060	12048		WASH,LOCK,SPLIT,S/S,#6	EA	12.000	\MS35338-136	7
5070	11148		SCREW,CAP,SOCKET HD,S/S,2-56x.25	EA	32.000		8
5080	12005		WASH,LOCK,SPLIT,S/S,#2	EA	32.000	\MS35338-134	9
5090	11010		SCREW,MACH,PAN HD,CROSS-REC,S/S,4-40 X .25	EA	4.000	\MS51957-13	10
5100	12047		WASH,LOCK,SPLIT,S/S,#4	EA	4.000	\MS35338-135	11
5110	12010		WASH,FLAT,S/S,#4,.250 OD X .125 ID X .022 THK	EA	4.000	\MS15795-803	12

ECN	DATE	REV
REL	16AUG99	-
10327	15DEC99	A
10362	14JAN00	B

REL #2022-01

SEE DETAIL-A 4PL

SEE DETAIL E 2PL

SEE DETAIL F

SEE DETAIL D

A22

P10

P12

U3

U6

U1

B1

B2

B3

PS2

A21 REF

K1

P11

P4

SEE DETAIL-G

SEE DETAIL-H

PS1

P3

CB1

FL1

J1

INT

18 19 37 4 2 3 39 4PL, FROM UNDERSIDE OF PT. NO (26) DO NOT SUBSTITUTE PART

14 7 11 2PL

SEE DETAIL-B (GND-1)

27 12PL

SEE DETAIL-J (GND-2)

26

11 7 4PL

BOTTOM VIEW

DETAIL A
TYP 4 PLACES

P/O WIRE HARNESS

FROM FL1 GND

DETAIL B

DETAIL D

DETAIL E
TYP 2 PLACES

DETAIL F

REF PS1

DETAIL G
TYP 2 PLACES

REF PS1

DETAIL H
TYP 2 PLACES

FROM PS1- GND

DETAIL J

FOR BOM SEE 1010554-501

SHT	1	2	3
REV	B	-	A

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FINISH	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED DO NOT SCALE DRAWING DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2 REMOVE ALL BURRS AND SHARP CORNERS

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
OVER 6 TO 24	±.05	±.010
OVER 24	±.08	±.015

50S1G4A

USED ON

DRAWN G.JACKSON DATE 9 JUN 99

CHKD G.JACKSON DATE 9 JUN 99

MFGR J.MAGINN DATE 8/18/99

ENGR F SCHIRK

AMPLIFIER RESEARCH

PS ASSY

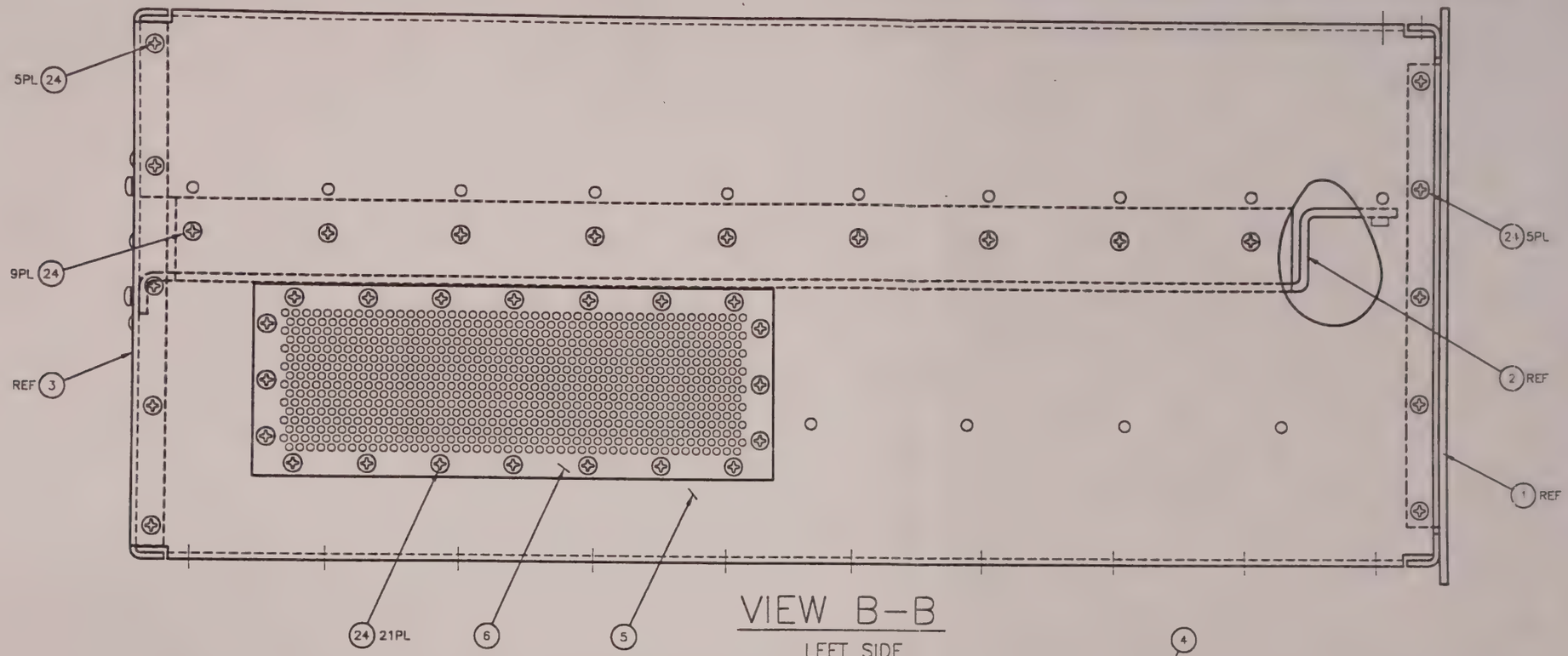
DWG NO. 1010554

SCALE

SHEET OF

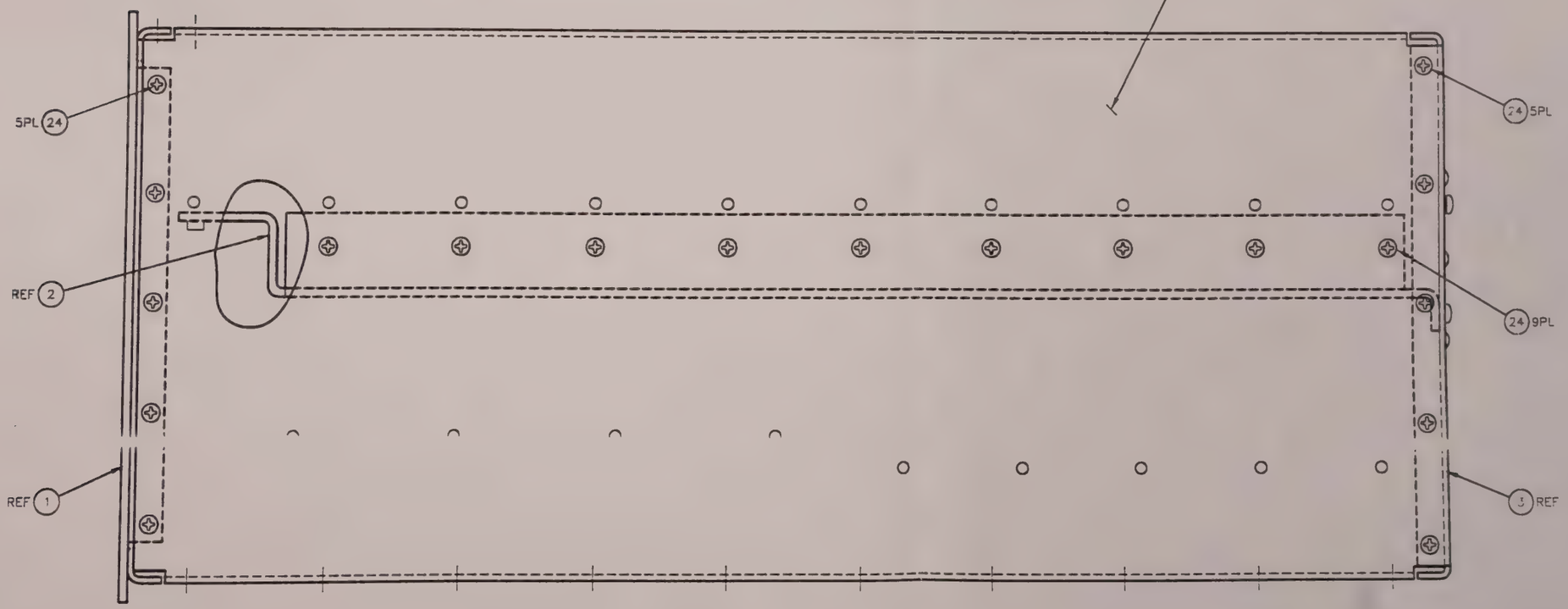
REV. SEE SHT 1

REL #2022-01	ECN	DATE	REV
	REL	6AUG20	-



VIEW B-B

LEFT SIDE



VIEW A-A

RIGHT SIDE

DWG NO.	1010554
SCALE 1/1	SHEET 2 OF 3

ECN	DATE	REV
REL	16AUG99	-
10327	15DEC99	A

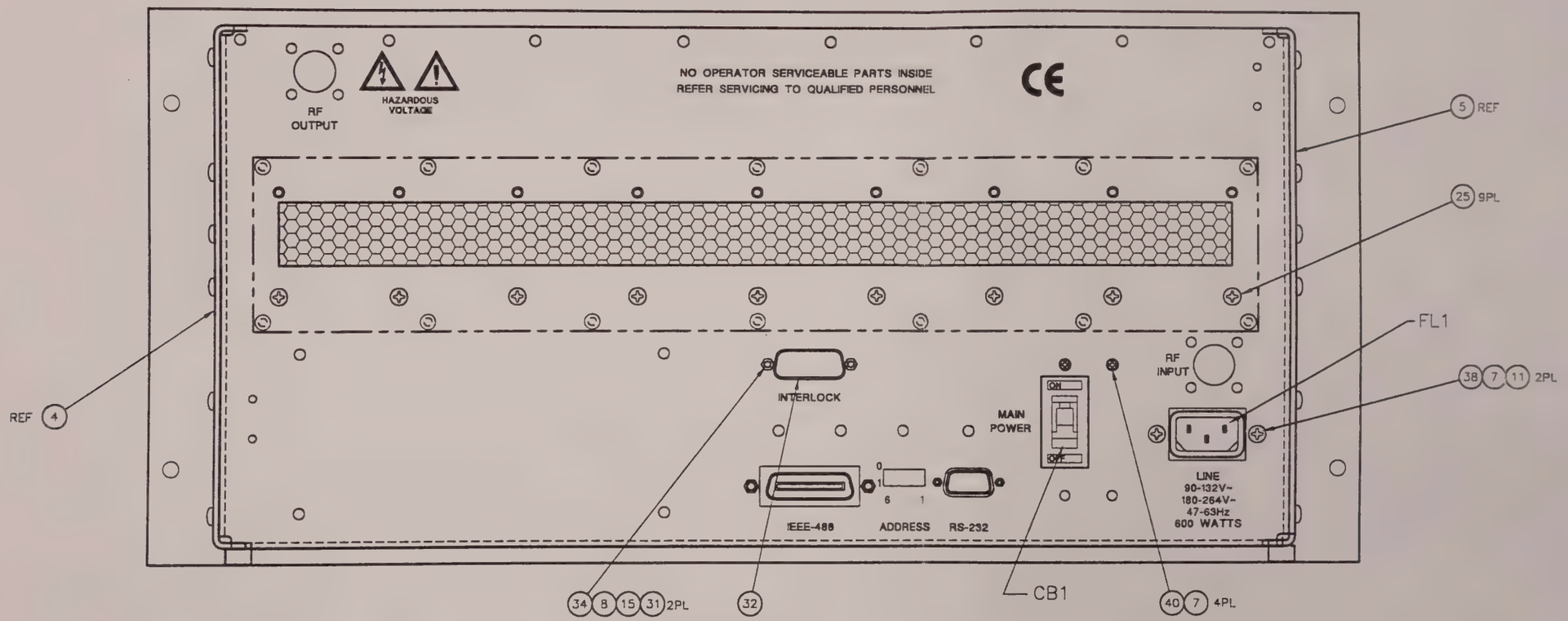
REL #2022-01

A

SEE SHT 2

B

SEE SHT 2



A

B

DWG NO.	1010554
SCALE 1/1	SHEET 3 OF 3
REV SEE SHT 1	

BILL NO: 1010554-501 REV: B U/M: EA DRAWING NO: ARC-D\1010554
PS ASSY

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1010552	B	SCHEM DIAG,50S1G4A	EA	REF	ARC-D\1010552	
0020	1010554	B	ASSY DWG,PS	EA	REF	ARC-D\1010554	
0100	1009512-501	-	REG CTRL BD ASSY	EA	1.000	ARC-C\1009512	A22
0200	37020	-	FAN,AXIAL,24 VDC,106 CFM,	EA	3.000	PAM\4124KX	B1 ,B2 B3
0205	35086	-	CKT BRKR,2 POLE,10A	EA	1.000	AIR\IEL11162F1001V	CB1
1400	35020		FILT,LINE,15 AMP	EA	1.000	SPR\15JX5451A	FL1
1700	43046		RELAY,MED PWR,12VDC COIL,30A CONTACT RATING	EA	1.000	DIGIKEY\PB298-ND	K1
2400	25066		PS,SWNG,85-264VAC,TRIPLE OUT,+5V,+12V,-12V,25W	EA	1.000	CPI\NFS25-7608	PS1
2410	25090		PS,SWNG,+15V,+24V,-24V	EA	1.000	AST\MP8-3N-4QQ-00	PS2
3720	60046		INTEGRATED CKT,3 TERM,POS REG.	EA	1.000	MOT\MC7815CT	U1
3740	60048		INTEGRATED CKT,3 TERM,NEG REG.	EA	1.000	MOT\MC7915CT	U6
3750	60066		IC,3 TERM,NEG REG	EA	1.000	MOT\MC7905CT	U3
5000	1010553-501	B	CTRL PNL ASSY	EA	1.000	ARC-D\1010553	1
5010	1010558-301	B	CHASSIS	EA	1.000	ARC-D\1010558	2
5020	1010562-301	A	PNL,REAR	EA	1.000	ARC-D\1010562	3
5030	1008607-101	B	PANEL,RT SIDE	EA	1.000	ARC-D\1008607	4
5040	1010559-101	-	PNL,LEFT SIDE	EA	1.000	ARC-D\1010559	5
5050	1010560-101	A	SCREEN	EA	1.000	ARC-B\1010560	6
5060	12048		WASH,LOCK,SPLIT,S/S,#6	EA	14.000	\MS35338-136	7
5070	12047		WASH,LOCK,SPLIT,S/S,#4	EA	7.000	\MS35338-135	8
5080	12050		WASH,LOCK,SPLIT,S/S,#10	EA	2.000	\MS35338-138	9
5090	12059		WASH,LOCK,EXT TOOTH,S/S,#10	EA	2.000	\MS35335-60	10
5100	13004		NUT,HEX,S/S,6-32,.250AF	EA	14.000		11
5110	13003		NUT,HEX,S/S,4-40,.187AF	EA	4.000		12

BILL NO: 1010554-501 REV: B U/M: EA DRAWING NO: ARC-D\1010554
PS ASSY

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M		QUANTITY-PER	DRAWING NUMBER	REF-DSG
5120	13007		NUT,HEX,S/S,10-32,.343AF	EA		3.000		13
5130	12011		WASH,FLAT,S/S,#6,.312 OD X .156 ID X .035 THK	EA		8.000	\MS15795-805	14
5140	12010		WASH,FLAT,S/S,#4,.250 OD X .125 ID X .022 THK	EA		6.000	\MS15795-803	15
5150	69090		INSUL,HD ANODIZED,TYPE TO-220,.950 L,.500 W	EA		2.000	THM\4777A	16
5160	12037		WASH,SHLDR,N,.232 OD X .115 ID X .047 SHLD.THK.	EA		2.000	REL\NY-04-040	17
5170	69238	-	BASE,MTG,CABLE TIE,ADH BACK,3/4 X 3/4	EA	A/R		TAB\TC-344A	18
5180	69161		CABLE TIES,1 3/8 MAX BUNDLE DIA,5 5/8 L	EA	A/R		PNT\PLT1.5MP	19
5200	14007		SPACER,HEX,NON-THD,.250 HEX X .250 LG X 6 ID	EA		6.000	HHS\2300	20
5220	12044		WASH,FLAT,NYLON,.312 OD X .140 ID X .125 THK	EA		23.000	MIP\16FW006125	22
5230	77064		COMPOUND,THERMAL JOINT,TYPE 120	EA	A/R		WAK\120-S	23
5240	11137		SCREW,MACH,PAN HD,CROSS-REC,S/ZN,6-32X.31,TYPE SW	EA		38.000		24
5250	11018		SCREW,MACH,PAN HD,CROSS-REC,ZN,6-32 X .38,TYPE SW	EA		9.000		25
5260	1010561-101	-	BASE PL	EA		1.000	ARC-D\1010561	26
5270	13024		NUT,SELF-LOCK,HEX,REG HT,NYLON INSERT,S/S,4-40	EA		12.000	\MS21044C04	27
5300	69262		SCREWLOCK KIT,F,USE WITH METAL SHELL"D"CONN	EA		1.000	AMP\207952-1	31
5310	69393		SWITCHING SHELL,15 PIN SUBMIN"D"	EA		1.000	CIN\DA19678-6	32
5320	1010555-501	A	HARNESS ASSY,PS,50S1G4A	EA		1.000		33
5330	11010		SCREW,MACH,PAN HD,CROSS-REC,S/S,4-40 X .25	EA		2.000	\MS51957-13	34
5355	69166		GROMMET,CATERPILLAR,NAT'L COLOR,.125 MAT'L THK	EA	A/R			37
5360	11065		SCREW,MACH,FLT HD,100 DEG,CROSS-REC,S/S,6-32 X .50	EA		2.000	\MS24693-C28	38
5370	11143		SCREW,MACH,FL HD,100 DEG,CROSS-REC,S/S,8-32 X .25	EA		4.000	\MS24693-C46	39
5380	11014		SCREW,MACH,PAN HD,CROSS-REC,S/S,6-32 X .25	EA		4.000	\MS51957-26	40

BILL NO: 1010555-501 REV: A U/M: EA DRAWING NO:
HARNESS ASSY,PS,50S1G4A

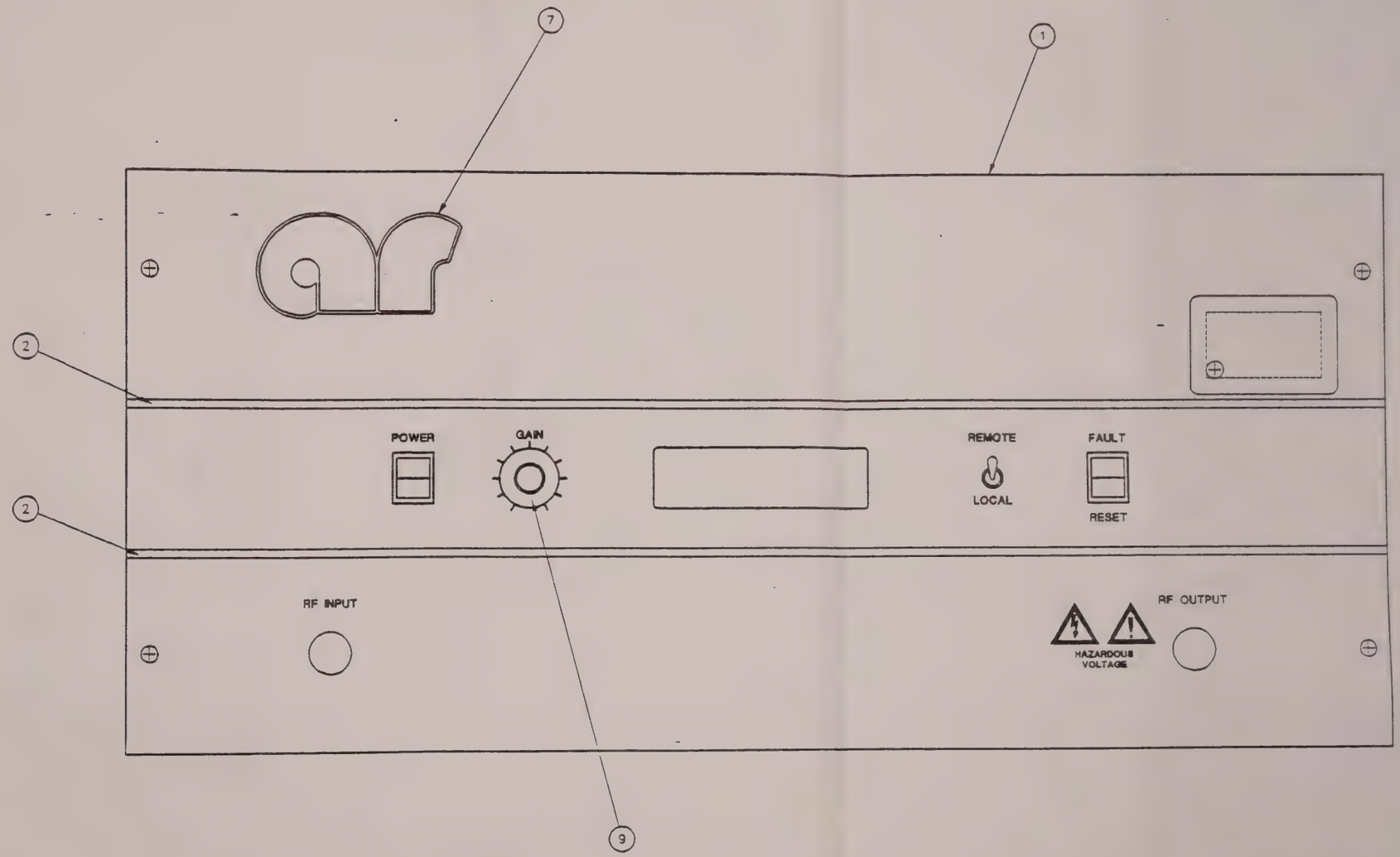
SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1010556	A	WIRE LIST,PS ASSY	EA REF		ARC-A\1010556	
0015	1010552	B	SCHEM DIAG,50S1G4A	EA REF		ARC-D\1010552	
0020	1010889-101	-	HARNESS BD,MODEL 50S1G4A	EA REF			
1500	41246		CONN,PLUG,44PIN,M	EA	1.000	AMP\748366-1	J1
1510	41244		TERM,CRIMP,TYP,M,20-28AWG	EA	33.000	AMP\748333-7	J1
1520	41272		CONN HOOD,CABLE CLAMP,PLASTIC,44 PIN	EA	1.000	AMP\207345-1	J1
1530	41158		CONN,SUBMINI "D",FILTD,15 PIN,(F)	EA	1.000	AMH\FCC17A15SM340	J3
2200	41182		CONN,PLUG,3 PIN,(F),18 AWG	EA	1.000	PNT\CT156F18-3	P3
2210	41059		CONN,THRU COVER,3 PIN	EA	1.000	PNT\TC156F-3-C	P3
2220	41075		CONN,PLUG,6 PIN,(F)	EA	1.000	PNT\CT156F22-6-C	P4
2230	41060		CONN,THRU COVER,6 PIN	EA	1.000	PNT\TC156F-6-C	P4
2240	41131		CONN,RECEPT,W/EARS & DETENT LOCK,9 CKT,M	EA	2.000	MOL\03-09-1092	P7 ,P13
2250	41105		TERM,.093 DIA,CRIMP TYPE,F,18-22 AWG	EA	11.000	MOL\02-09-1119	P7 ,P13
2260	41215		CONN,RECEPT,10 CKT,W/CONTACTS	EA	1.000	AST\70-841-004	P8
2270	41280		CONN,PLUG,14 POS	EA	1.000	BEG\69176-014	P9
2280	41267		TERM,.025 SQUARE,CRIMP TYPE,F,22-26 AWG	EA	13.000	BEG\47747-000	P9
2290	41188		CONN,PLUG,20 PIN,(F)	EA	2.000	PNT\CT100F22-20-Q	P10 ,P12
2300	41189		COVER,CONN,20 PIN	EA	2.000	PNT\TC100F-20-Q	P10 ,P12
2310	41166		CONN,SUBMINI"D",NON-FILTD,15 PIN (M)	EA	1.000	AMH\117DA15P	P11
2320	41107		TERM,.093 DIA,CRIMP TYPE,M,18-22 AWG	EA	1.000	MOL\02-09-2118	P13
2330	41299		TERM,.093 DIA,CRIMP,TYPE F,24-30AWG	EA	6.000	MOL\02-09-1144	P13
5000	69136		TERM,INSUL,PUSH-ON,F,16-14 AWG,.032 X .250 TAB	EA	5.000	TAB\RB-257	
5010	69145		TERM,RING,INSUL,#10 STUD,16-14 AWG	EA	11.000	TAB\RB-877	
5020	69139		TERM,RING,INSUL,#10 STUD,8 AWG	EA	1.000	TAB\RD-367	

BILL NO: 1010555-501 REV: A U/M: EA DRAWING NO:
HARNESS ASSY,PS,50S1G4A

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
5030	69143		TERM,RING,INSUL,,#6 STUD,16-14 AWG	EA	1.000	TAB\RB-857	
5040	69140		TERM,RING,INSUL,#6 STUD,22-16 AWG	EA	3.000	TAB\RA-857	
5050	69146		TERM,RING,INSUL,#10 STUD,10 AWG	EA	2.000	TAB\RC-367	
5060	69357		TERM,INSUL,PUSH-ON,R.A.,F,16-14,AWG,.032X.250 TAB	EA	2.000	TAB\RB2577F	
5070	69323		TERM,INSUL,PUSH-ON,F,22-18 AWG,.020 X .110 TAB	EA	6.000	TAB\RA18-111F	
5080	69137		TERM,INSUL,PUSH-ON,F,22-18 AWG,.032 X .250 TAB	EA	2.000	TAB\RA-257	

REL #2022-01

ECN	DATE	REV.
REL	6AUG99	-
10127	15DEC99	A
10353	5JAN00	B



SHEET	1	2
REV	B	B

FOR BOM SEE 1010553-501

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND TOLERANCE PLUS/MINUS THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SCREW, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
OVER 6 TO 24	±.03	±.010
OVER 24	±.05	±.010

ANGULAR TOLERANCE ±1°

5051CAA
USED ON MODEL

DRAWN G.JACKSON DATE 3 MAY 99
CHKD G.JACKSON DATE 3 MAY 99
MECH J.MAGINN DATE 8/18/99
ELEC F.SCHIRN DATE 17 AUG 99

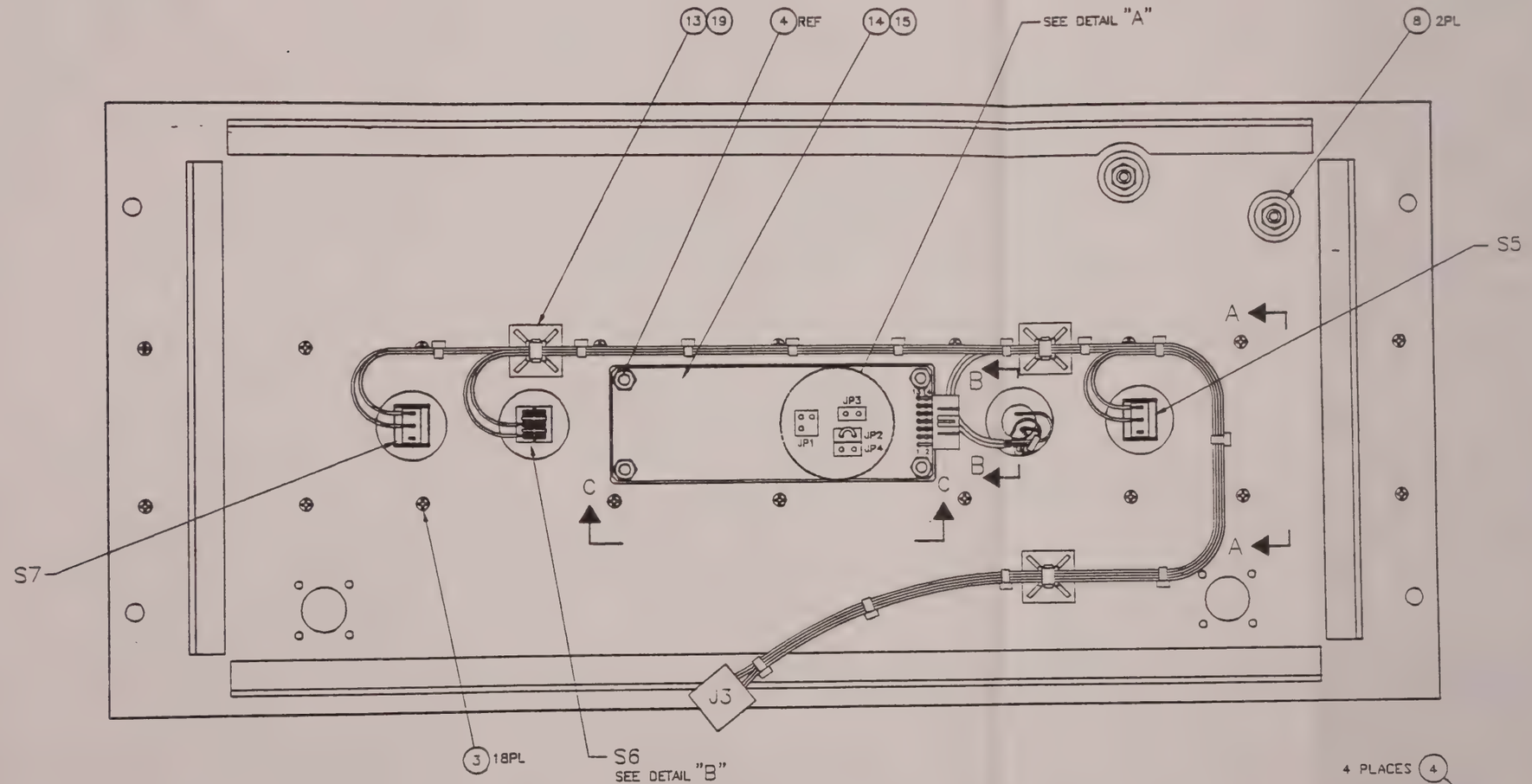
AMPLIFIER RESEARCH

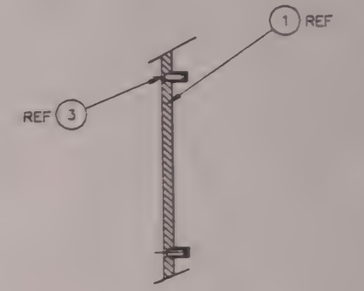
CTRL PANEL ASSY

DWG. NO. 1010553

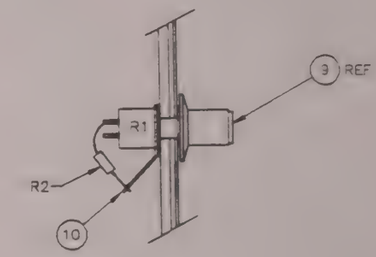
SCALE 1/1 SHEET 1 OF 2 REV. SEE REV BLK

REL #2022-01	ECN	DATE	REV
	REL	04AUG22	-
	1033	20SEP22	A
	1035	31AUG22	B

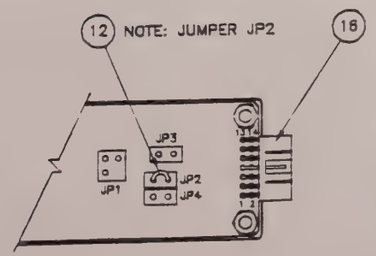




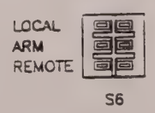
SECTION A–A
9 PLACES



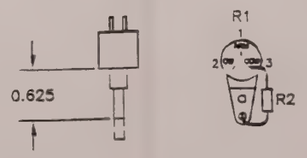
SECTION B–B



DETAIL "A"

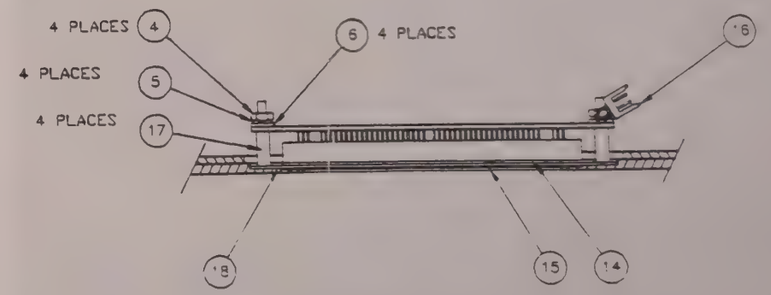


DETAIL "B"



DETAIL OF R1

THE SHAFT OF R1 MUST BE TRIMMED IF IT IS GREATER THAN .625" FROM THE BASE OF THE THREADED SHOULDER. DO NOT TRIM TO LESS THAN .625".



SECTION B–B

NOTE:
ITEM 15, FILTER, MUST HAVE THE FLAT (NON-SHINEY) SIDE DISPLAYING TO THE OUTSIDE.

DWG. NO.	1010553	
SCALE 1/1	SHEET 2 OF 2	SHT

BILL NO: 1010553-501 REV: B U/M: EA DRAWING NO: ARC-D\1010553
CTRL PNL ASSY

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1010553	B	ASSY DWG,CTRL PNL	EA	REF	ARC-D\1010553	
0020	1010717	-	WIRE LIST,CTRL PNL	EA	REF	ARC-A\1010717	
2200	41103		CONN,PLUG,9 PIN	EA	1.000	MOL\03-09-2092	J3
2210	41107		TERM,.093 DIA,CRIMP TYPE,M,18-22 AWG	EA	8.000	MOL\02-09-2118	J3
2700	55901	-	RES,VAR,CP,10K,10%,1/2W	EA	1.000	CLA\RV6NAYSA103A	R1
2710	55612-1202J	-	RES,FXD,METAL FILM,12K,5%,1/4-1/2W	EA	1.000	TRW\GP55-1202+/-5%	R2
3100	57042		SW,TOGGLE,MINI,DPDT,5A,125VAC	EA	1.000	A-S\MST-205N	S6
3120	57089	-	SW,PB,MOM,SPDT(N.O.)	EA	2.000	CKS\8121J81ZGE22	S5 ,S7
5000	1010542-301	A	PNL,CTRL	EA	1.000	ARC-D\1010542	1
5020	1008867-101-F2	-	RAIL,TRIM	EA	2.000	ARC-C\1008867	2
5030	11100		SCREW,MACH,FLT HD,100 DEG,CROSS-REC,S/S,2-56X.25	EA	18.000		3
5040	13003		NUT,HEX,S/S,4-40,.187AF	EA	4.000		4
5050	12047		WASH,LOCK,SPLIT,S/S,#4	EA	4.000	\MS35338-135	5
5060	12010		WASH,FLAT,S/S,#4,.250 OD X .125 ID X .022 THK	EA	4.000	\MS15795-803	6
5070	1006361-101	A	LOGO,DIECAST,1.50	EA	1.000	ARC-B\1006361	7
5080	14001	-	FASTENER,PALNUT,WASH TYPE,SELF THDG	EA	2.000	TRW\SD188009-SOH	8
5090	69018		KNOB,SKIRTED,1/8"SHAFT,MATTE FINISH	EA	1.000	ROG\MF-RB-67-0SK7M	9
5100	69242		LUG,SHAKEPROOF,13/16 L,#1/4 STUD,DUAL HOLE	EA	1.000	HHS\1410-14	10
5120	66047		WIRE,BUSS,TINNED COPPER,22 AWG	IN	A/R	ALP\9022	12
5130	69162		CABLE TIES,7/8 MAX BUNDLE DIA,4 L	EA	A/R	DEN\08432	13
5140	69384		DISPLAY,VAC FLUORESCENT,2 ROWS,20 CHARACTERS	EA	1.000	NOR\CU20025ECPBU1J	14
5150	1009173-101	B	FILTER,AMBER,2 LINE DISPLAY	EA	1.000	ARC-B\1009173	15
5160	41279		CONN,HEADER,R/A,14 POS	EA	1.000	BEG\78207-114	16
5170	14056		SPACER,RND,ALUM,.125 ID X .167 OD X .437 LG	EA	4.000	KEY\401	17

BILL NO: 1010553-501 REV: B U/M: EA DRAWING NO: ARC-D\1010553
CTRL PNL ASSY

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
5180	1010628-101	-	RETAINER,FILTER	EA	1.000	ARC-B\1010628	18
5190	69238	-	BASE,MTG,CABLE TIE,ADH BACK,3/4 X 3/4	EA	A/R	TAB\TC-344A	19

SPARES

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIND	MATL
			PARTS LIST			

DRAWN	J.H.REED DATE 27 FEB 97
CHKD	J.H.REED DATE 17 JUN 97
MECH	J.MACINN DATE 17 JUN 97
ELEC	J.BARRETT DATE 17 JUN 97

USED ON 305104 ADDL

ANALOGIC RESEARCH

SCHEMATIC

OPERATE/CONTROL BD(OC8)

DWG NO. 1008597

SCALE 1/1 SHEET . OF . REV

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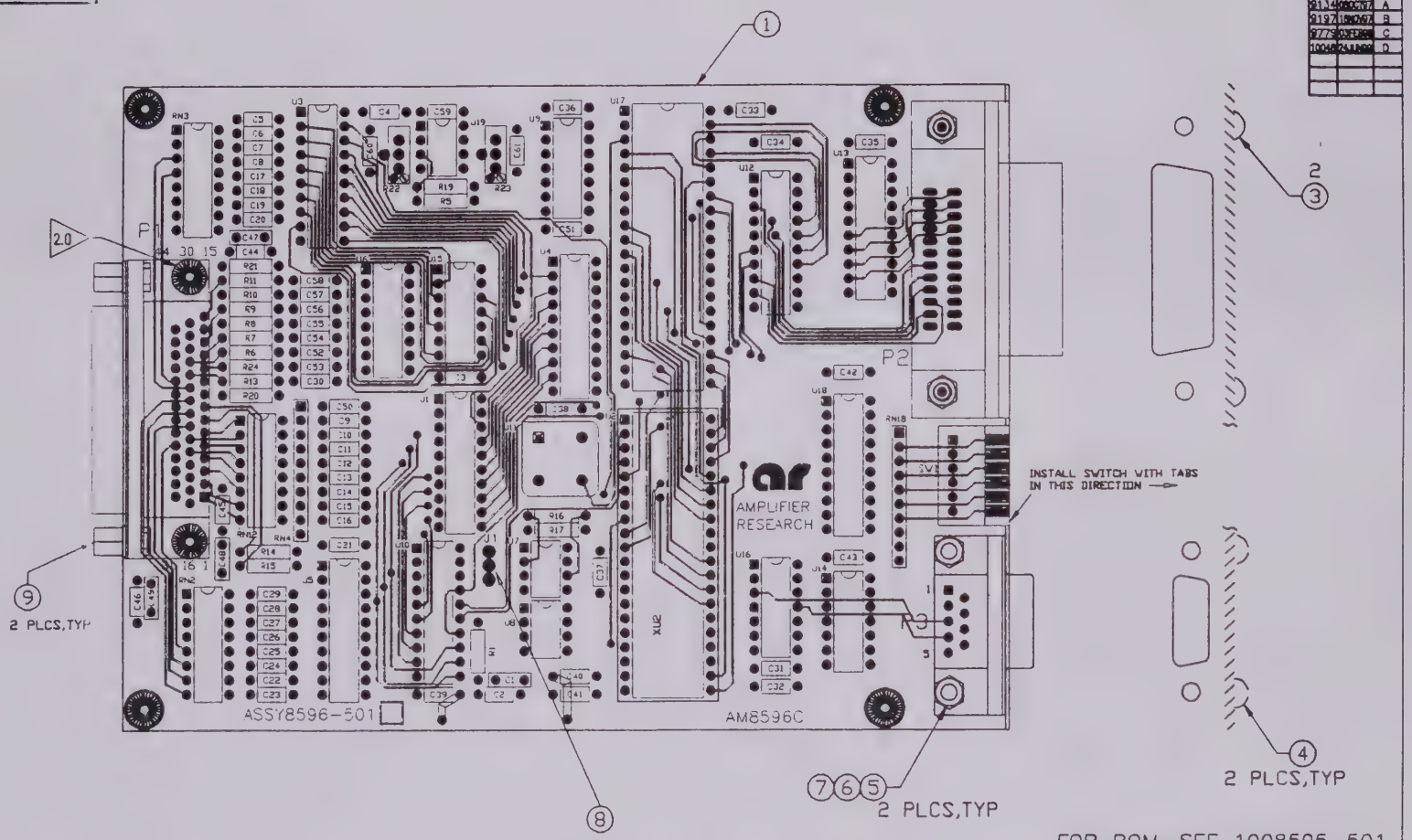
ECN	DATE	REV
000051	14 FEB 97	1
000091	18 JUN 97	2
REL	13 JUN 97	–
91134	000 '97	A
9197	18 JUN 97	B
9775	03 SEP 97	C
100458	24 JUN 97	D



FOR BOM, SEE 1008595-501

NOTES:

1.0 USE SOCKET ONLY ON U2

2.0 MOUNTING TABS, SOLDER 2 PLACES.

3.0 THIS IS A MULTI-LAYER BOARD. USE CARE IN INSTALLING OR REMOVING COMPONENTS.

4.0 SOLDER FROM FAR SIDE ONLY USING MINIMUM HEAT

ITEM QTY. REQD.	PART NO.	DESCRIPTION PARTS LIST	MARK	FIN	MATL

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SCREW, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.008
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015

ANGULAR DIMENSIONS ±1/2°

DRAWN	J.H.REED
DATE	14 FEB 97
CHKD	J.H.REED
DATE	17 JUN 97
MECH	J.MAGINN
DATE	20 AUG 97
ELEC	F.SCHIRK
DATE	21 AUG 97

AMPLIFIER RESEARCH

ASSEMBLY DRAWING
OPERATE/CONTROL(OCB)

DWG. NO. 1008595

USED ON MODEL	SCALE	SHEET	REV
50S1G4	2 : 1	1 OF 1	D

BILL NO: 1008595-501 REV: C U/M: EA DRAWING NO: ARC-C\1008595
PWB ASSY,OPERATE/CONTROL(OCB)

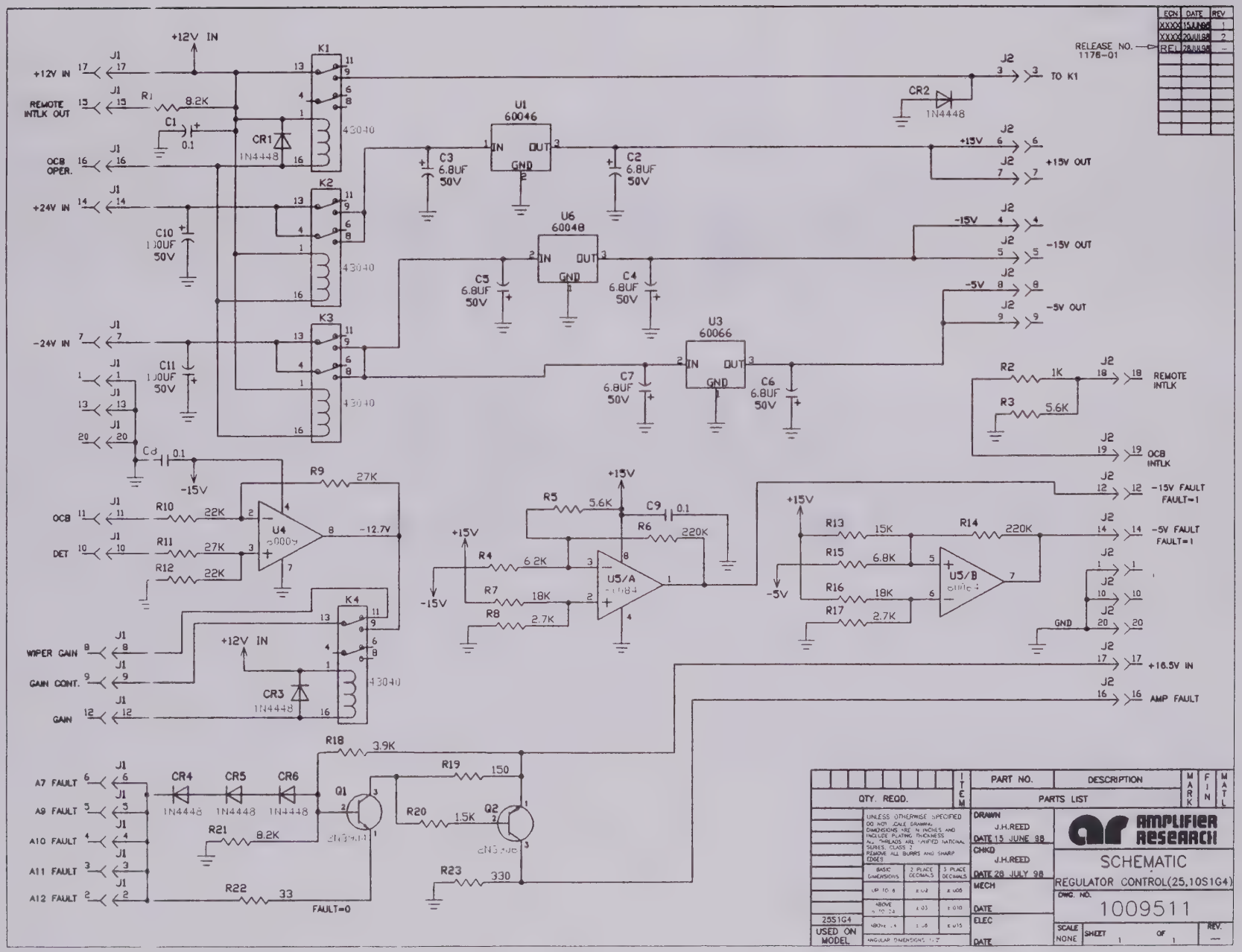
SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1008597	B	SCHEM DIAG,OPERATE/CONTROL(OCB)	EA	REF	ARC-D\1008597	
0020	1008595	D	ASSY DWG,OPERATE/CONTROL(OCB)	EA	REF	ARC-C\1008595	
0400	27229		CAPR,CER,2.2uF,50V	EA	4.000	\RPE210Z5U225Z050V	C1 ,C47 C48 ,C49
0410	27236		CAPR,FXD,DIP SPACED CER,.1UF,50VDC	EA	22.000	AVX\MD015C104MAA	C2 ,C3 C4 ,C9 C10 ,C11 C21 ,C31 C32 ,C33 C34 ,C35 C36 ,C37 C38 ,C39 C40 ,C41 C42 ,C43 C50 ,C51
0420	27263		CAPR,FXD,DIP SPACED CER,.01uF,100V	EA	35.000	AVX\MD011C103KAB	C5 ,C6 C7 ,C8 C12 ,C13 C14 ,C15 C16 ,C17 C18 ,C19 C20 ,C22 C23 ,C24 C25 ,C26 C27 ,C28 C29 ,C30 C44 ,C45 C46 ,C52 C53 ,C54 C55 ,C56 C57 ,C58 C59 ,C60 C61
1500	41310		CONN,LOCKING HEADER,STR,3 PIN,.10 CTRS	EA	1.000	MOL\22-10-2031	J1
2200	41234		CONN,RECEPT,44 CKT,R.A. PC MOUNT	EA	1.000	AMP\748482-5	P1
2210	41241		CONN,RECEPT,24PIN	EA	1.000	AMP\553811-1	P2
2220	41242		CONN,RECEPT,9 PIN	EA	1.000	AMP\745781-4	P3
2700	55612-10R0F		RES,FXD,FILM,10 OHM	EA	7.000	\RN55D10R0F	R1 ,R6 R7 ,R8

BILL NO: 1008595-501 REV: C U/M: EA DRAWING NO: ARC-C\1008595
PWB ASSY,OPERATE/CONTROL(OCB)

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
							R9 ,R13 R24
2710	55612-1002F		RES,FXD,PRECISION,10K,1%,1/4-1/2W,CHAR.D	EA	6.000	MFG\RN55D1002F	R5 ,R16 R17 ,R19 R20 ,R21
2720	55612-1001F		RES,FXD,PRECISION,1K,1%,1/4-1/2W,CHAR.D	EA	2.000	MFG\RN55D1001F	R10 ,R11
2730	55612-1000F		RES,FXD 100 OHM1/4W,1%	EA	2.000	MFG\RN55D1000F	R14 ,R15
2740	55920		RES,VAR,CERMET,MULTITURN,TOP ADJ,20K,10%,1/2W	EA	2.000	BOR\3299Y-1-203	R22 ,R23
2750	55946		RES,16PIN DIP,1K	EA	3.000	BOR\4116R-001-102	RN2 ,RN3 RN12
2760	55943		RES,10 PIN SIP,100K,100MW	EA	2.000	CTS\770-101-R-100K	RN4 ,RN18
3100	57088		SWITCH,DIP ROCKER,6 POS	EA	1.000	GRY/76PSB06	SW1
3700	60087		I.C.,INVERTING BUFFER	EA	3.000	NSI\MM74HC541N	U1 ,U3 U18
3720	60088		I.C.FLIP-FLOP	EA	2.000	NSI\MM74HCD574N	U4 ,U5
3730	60093		I.C.DARLINGTON DRIVER	EA	1.000	NSI\DS2003CN	U6
3740	60096		I.C.OP AMP	EA	2.000	NSI\LF351N	U7 ,U8
3750	60091		I.C.HEX INVERTER	EA	1.000	NSI\DM74LS04N	U9
3760	60090		I.C.CMOS DAC	EA	1.000	AND\AD7248AAN	U10
3770	25062		OSC,CLOCK 20MHZ	EA	1.000	CTS\MX045HS	U11
3780	60123		IC,TRANSCEIVER,8 CHANNEL	EA	1.000	TII\SN75161BN	U12
3790	60097		I.C.TRANSCEIVER	EA	1.000	NSI\DS75160AN	U13
3800	60094		I.C.RECEIVER,CMOS	EA	1.000	MAX\MAX1489ECPD	U14
3810	60089		I.C.DIODE ARRAY	EA	1.000	MOT\MAD1103P	U15
3820	60095		I.C.CMOS LINE DRIVER	EA	1.000	MAX\MAX1488ECPD	U16
3830	60086		I.C.NEC MPD7210 REPLACEMENT	EA	1.000	NSI\NAT7210APD	U17
3840	60013		INTEGRATED CKT,LINEAR,DUAL,OP.AMP.	EA	1.000	RCA\CA3240AE	U19

BILL NO: 1008595-501 REV: C U/M: EA DRAWING NO: ARC-C\1008595
PWB ASSY,OPERATE/CONTROL(OCB)

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
4510	73031		SOCKET,IC,40PIN	EA	1.000	TII\C93-40-02	XU2
5000	1008596-101	C	PWB,OPERATE/CONTROL(OCB)	EA	1.000	ARC-C\1008596	1
7100	11032		SCREW,MACH,PAN HD,CROSS-REC,S/ZN,4-40X.38,TYPE SW	EA	A/R		3
7110	11011		SCREW,MACH,PAN HD,CROSS-REC,S/S,4-40 X .38	EA	A/R	\MS51957-15	4
7500	12010		WASH,FLAT,S/S,#4,.250 OD X .125 ID X .022 THK	EA	A/R	\MS15795-803	5
7510	12047		WASH,LOCK,SPLIT,S/S,#4	EA	A/R	\MS35338-135	6
7520	13003		NUT,HEX,S/S,4-40,.187AF	EA	A/R		7
7530	53025		SHUNT,2 PIN	EA	1.000	D-K\929955-06-ND	8
7540	69262		SCREWLOCK KIT,F,USE WITH METAL SHELL"D"CONN	EA	1.000	AMP\207952-1	9



ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED DO NOT SCALE DRAWING. DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS. ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2. REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015

ANGULAR DIMENSIONS ±2°

25S1G4
USED ON MODEL

DRAWN J.H.REED DATE 15 JUNE 98
CHKD J.H.REED DATE 28 JULY 98
MECH DATE
ELEC DATE

AMPLIFIER RESEARCH

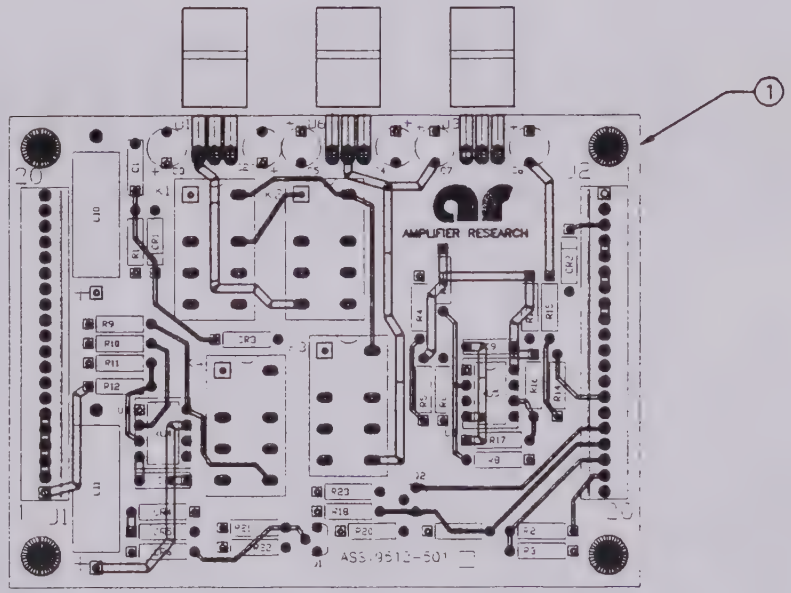
SCHEMATIC
REGULATOR CONTROL(25,10S1G4)

DWG. NO. 1009511

SCALE NONE SHEET 1 OF 1 REV. -

ECN	DATE	REV
XXXXX	23 JUNE 98	1
REL	28 JULY 98	–

RELEASE NO. 1178-01



FOR BOM: SEE 1009512-501

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	± .02	± .005
ABOVE 6 TO 24	± .03	± .010
ABOVE 24	± .08	± .015

ANGULAR DIMENSIONS ± 2°

DRAWN	J.H.REED
DATE	23 JUNE 98
CHKD	J.H.REED
DATE	28 JULY 98
MECH	
DATE	
ELEC	
DATE	

AMPLIFIER RESEARCH

ASSEMBLY DRAWING

REGULATOR CONTROL(25,10S1G4)

DWG. NO. 1009512

USED ON MODEL 25S1G4

SCALE 2/1 | SHEET 1 OF 1 | REV. –

BILL NO: 1009512-501 REV: - U/M: EA DRAWING NO: ARC-C\1009512
REG CTRL BD ASSY

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1009511	-	SCHEM DIAG,REG CTRL BD	EA	REF	ARC-C\1009511	
0020	1009512	-	ASSY DWG,REG CTRL BD	EA	REF	ARC-C\1009512	
0400	27236		CAPR,FXD,DIP SPACED CER,.1UF,50VDC	EA	3.000	AVX\MD015C104MAA	C1 ,C8 C9
0410	27055		CAPR,TANT,6.8UF,50V	EA	6.000	MAL\TDC685K050NLF	C2 ,C3 C4 ,C5 C6 ,C7
0420	27068		CAPR,ELECT,100uF,50VDC,AXIAL	EA	2.000	ICI\107TTA050M	C10 ,C11
0700	1N4448		DIODE,SIGNAL,75V PIV	EA	6.000	FCH\1N4448	CR1 ,CR2 CR3 ,CR4 CR5 ,CR6
1500	41187		CONN,LOCKING HEADER,STR,20 PIN,.10 CNTRS	EA	2.000	PNT\MLSS100-20	J1 ,J2
1700	43040		RELAY,LO-PWR,DPDT,12VDC,360 OHMS,PIN L POS	EA	4.000	ARO/DS2EMDC12V	K1 ,K2 K3 ,K4
2500	2N3904		XSTR,SWNG,NPN,40V,0.2A,1W	EA	1.000		Q1
2510	2N3906		XSTR,SWNG,PNP,40V,0.2A,1W	EA	1.000	ARE\2N3906	Q2
2700	55612-8201J		RES,FXD,METAL FILM,8.2K,5%,1/4-1/2W	EA	2.000	TRW\GP55-8201+/-5%	R1 ,R21
2710	55612-1001J		RES,FXD,METAL FILM,1K,5%,1/4-1/2W	EA	1.000	TRW\GP55-1001+/-5%	R2
2720	55612-5601J		RES,FXD,METAL FILM,5.6K,5%,1/4-1/2W	EA	2.000	TRW\GP55-5601+/-5%	R3 ,R5
2730	55612-6201J	-	RES,FXD,METAL FILM,6.19K,1%,1/4W	EA	1.000	IRC\RN55D6191F	R4
2740	55612-2203J		RES,FXD,METAL FILM,220K,1%,1/4-1/2W	EA	2.000	TRW\GP55-2203+1-5%	R6 ,R14
2750	55612-1802J		RES,FXD,METAL FILM,18K,5%,1/4-1/2W	EA	2.000	TRW\GP55-1802+/-5%	R7 ,R16
2760	55612-2701J		RES,FXD,METAL FILM,2.7K,5%,1/4-1/2W	EA	2.000	TRW\GP55-2701+/-5%	R8 ,R17
2770	55612-2702J		RES,FXD,METAL FILM,27K,5%,1/4-1/2W	EA	2.000	TRW\GP55-2702+/-5%	R9 ,R11
2780	55612-2202J		RES,FXD,METAL FILM,22K,5%,1/4-1/2W	EA	2.000	TRW\GP55-2202+/-5%	R10 ,R12
2790	55612-1502J		RES,FXD,METAL FILM,15K,5%,1/4-1/2W	EA	1.000	TRW\GP55-1502+/-5%	R13
2800	55612-6801J		RES,FXD,METAL FILM,6.8K,5%,1/4-1/2W	EA	1.000	TRW\GP55-6801+/-5%	R15

BILL NO: 1009512-501 REV: - U/M: EA DRAWING NO: ARC-C\1009512
REG CTRL BD ASSY

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
2810	55612-3901J		RES,FXD,METAL FILM,3.9K,5%,1/4-1/2W	EA	1.000	TRW\GP55-3901+/-5%	R18
2820	55612-1500J		RES,FXD,METAL FILM,150,5%,1/4-1/2W	EA	1.000	TRW\GP55-1501+/-5%	R19
2830	55612-1501J		RES,FXD,METAL FILM,1.5K,5%,1/4-1/2W	EA	1.000	TRW\GP55-1501+/-5%	R20
2840	55512-33R0J		RES,FXD,CARBON COMP,33,5%,1/4W	EA	1.000	A-B\CB3305	R22
2850	55612-3300J		RES,FXD,METAL FILM,330,5%,1/4-1/2W	EA	1.000	TRW/GP55-330 +/-1%	R23
3700	60046		INTEGRATED CKT,3 TERM,POS REG.	EA REF		MOT\MC7815CT	U1
3710	60066		IC,3 TERM,NEG REG	EA REF		MOT\MC7905CT	U3
3720	60009		INTEGRATED CKT,LINEAR,OP.AMP.	EA	1.000	RCA\CA3140AE	U4
3730	60064		IC,DUAL,COMPARATOR	EA	1.000	MOT\LM393AN	U5
3740	60048		INTEGRATED CKT,3 TERM,NEG REG.	EA REF		MOT\MC7915CT	U6
4500	73010		SOCKET,I.C.,8 PIN,DIP	EA	2.000	TII\C93-08-02	XU4 ,XU5
5000	1009513-101	-	PWB,REG CTRL	EA	1.000	ARC-B\1009513	1

SECTION VI

RECOMMENDED SPARE PARTS

6.1 LEVEL OF MAINTENANCE

Three separate lists of parts are recommended for maintenance of the related amplifier. Each list will contain parts that will be required for repairs to be performed at a particular level of technical expertise and equipment needed to perform this level of maintenance. The three levels of maintenance are as follows.

Level 1—Technician Level

Performed at equipment location with connectorized items. Limited to replacement of printed wiring boards (PWBs), amplifier assemblies, fuses, and so forth. Requires qualified technical personnel. Suggested when down time must be minimized.

Level 2—Field Service/Shop Level

Parts replacement requiring minimum adjustment or alignment. Includes PWB repair, and replacement of controls, power supply components, fans, and individual Radio Frequency (RF) components that would not adversely affect the amplifier's alignment.

Level 3—Factory-Authorized Level

Repairs that require amplifier alignment or major adjustments. To be performed by a qualified technical staff in a properly instrumented laboratory.

BILL NO: 1010643-501 REV: B U/M: EA DRAWING NO: ARC-D\1010643
MODEL 60S1G3,1.0-3.0GHz,60 WATTS

ITM	PART NUMBER AND DESCRIPTION	DRAWING NUMBER	REV	U/M	SCRAP PCTG	MRP	MANF CLASS	QUANTITY-PER	SPARE-QTY	LEVEL	REFERENCE DESIGNATORS
1	55901	CLA\RV6NAYSA103A	-	EA		P	RV12	0.000	0	2 3	R1
	RES,VAR,CP,10K,10%,1/2W							0.000			
2	57042	A-S\MST-205N		EA		P	SW01	0.000	0	2 3	S6
	SW,TOGGLE,MINI,DPDT,5A,125VAC							0.000			

AMPLIFIER RESEARCH

MODEL NO. 60S1G3
SERIAL NO. 3000020
TESTED BY P J G
DATE 12/08/00

TEST DATA SHEET

FREQ. (GHz)	POWER OUTPUT @ 1dB COMPRESSION (WATTS)	POWER OUTPUT SATURATED (WATTS) @ 0dBm INPUT	HARMONIC DISTORTION @ 50 WATTS
0.8	65	74	-27
1.0	>80	80	-24
1.25	75	80	-28
1.5	>77	77	-32
1.75	69	80	-35
2.0	60	69	-34
2.25	64	75	-35
2.5	70	72	-57
2.75	64	75	-41
3.0	60	67	-58

MINIMUM GAIN 52.5 dB @ 1.8 WATTS OUTPUT (at 2GHz)

FLATNESS ± <1.0 dB

OPEN TEST √ (√)

SHORT TEST √ (√)

STABILITY √ (√)

SPURIOUS √ (√)

INPUT VSWR <2.0:1

INPUT ATTEN. RANGE √ (√)

3RD ORDER INTERMOD √ (√)

LINE VOLTAGE PERFORMANCE √ (√)

REMOTE IEEE-488/RS-232 √ (√)

TEST EQUIPMENT	S/N
SIGNAL GENERATOR	TEC-SG 1991
SWEEP GENERATOR	TEC-SW 1991
POWER METER	TEC-PM 1411
SPECTRUM ANALYZER	TEC-SA 1756
NETWORK ANALYZER	TEC-OS 1991
FIXED ATTEN. 40 dB	TEC-AT 1848
FIXED ATTEN. --- dB	TEC-AT -----

TEST EQUIPMENT CALIBRATION TRACEABLE TO
NATIONAL INSTITUTE OF STANDARDS & TECHNOLOGY. (NIST)

AMPLIFIER RESEARCH
In compliance to IEC 1010-1
Safety requirements of electrical equipment for laboratory use
Annex K

ROUTINE TESTS

Model : 60S1G3M2

Serial No. : 300020

Date : 12-8-00

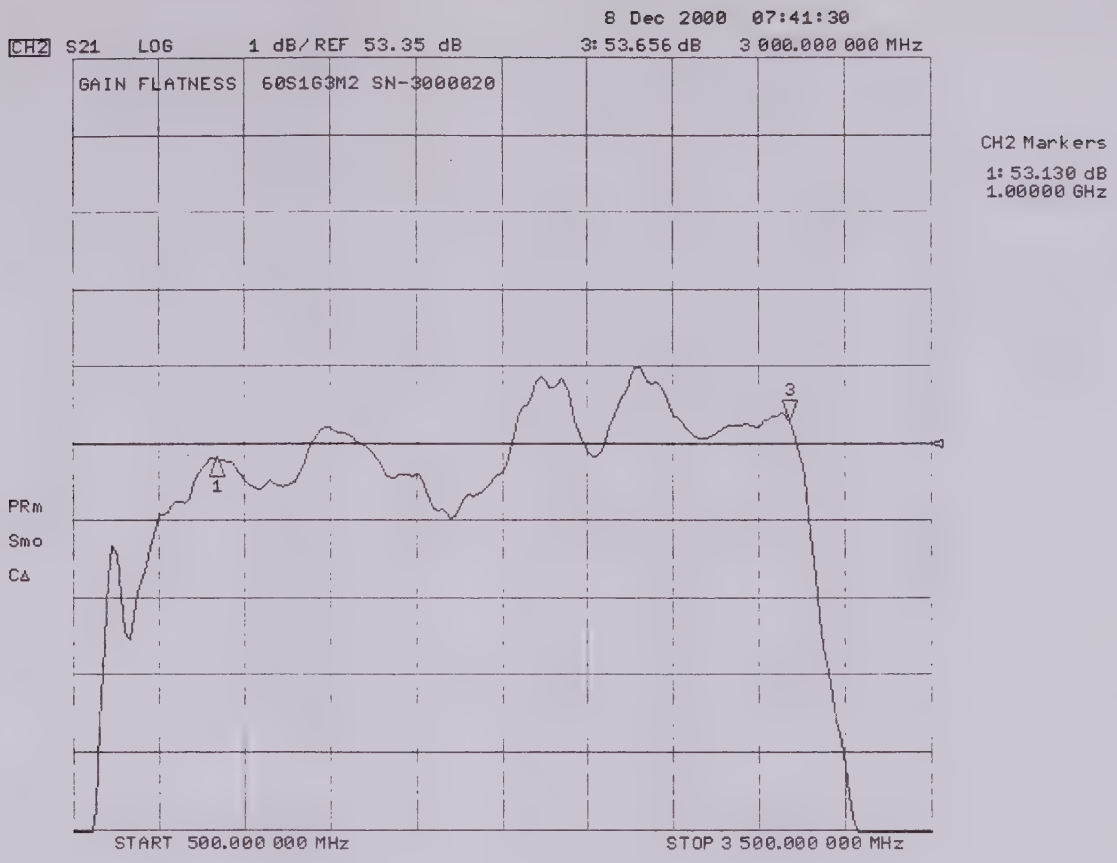
Inspected By : PJG

Tests: For equipment with working voltage up to 300 V

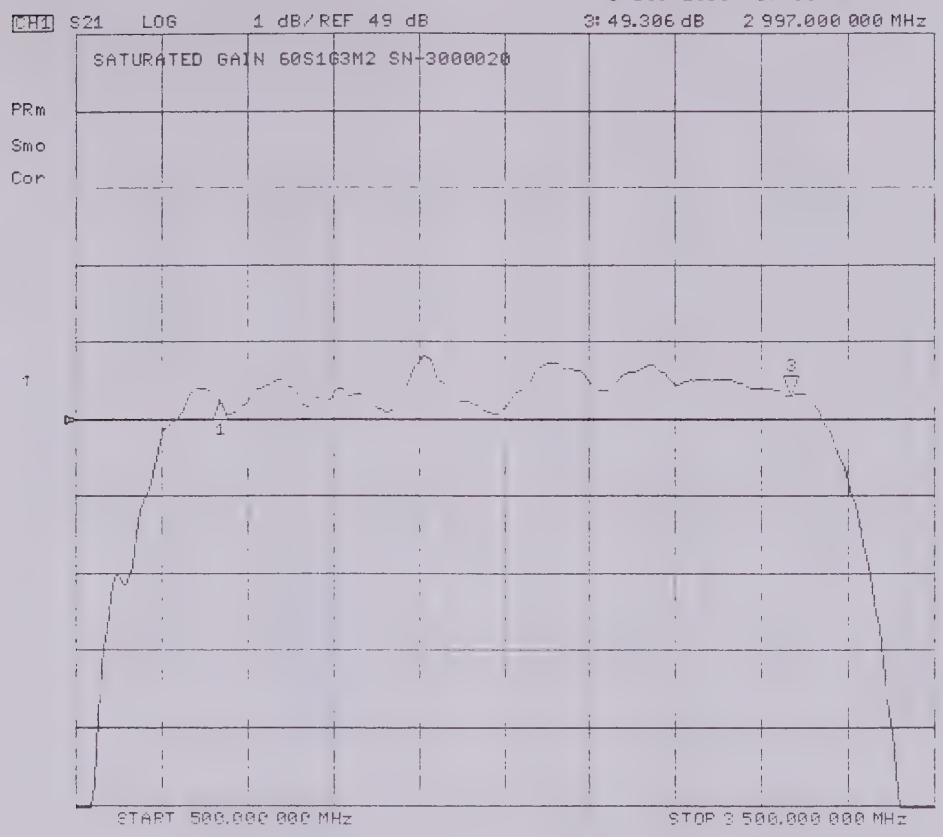
Protective earth resistance	Limit	
Apply 25 amps between protective terminal and **ACCESSIBLE** parts. Record resistance.	≤ 0.1 ohms	.05 ohms

Mains circuit insulation	(Circle one)	(√)
Apply voltage from the mains input to chassis for a period of time greater than two (2) seconds. No arcing or breakdown should occur.	1350 VAC (1900 VDC)	√

Floating input terminals	Record Voltage	(√)
Apply 1.5 times working voltage to floating input terminals, where applicable. No arcing or breakdown should occur.	—	—

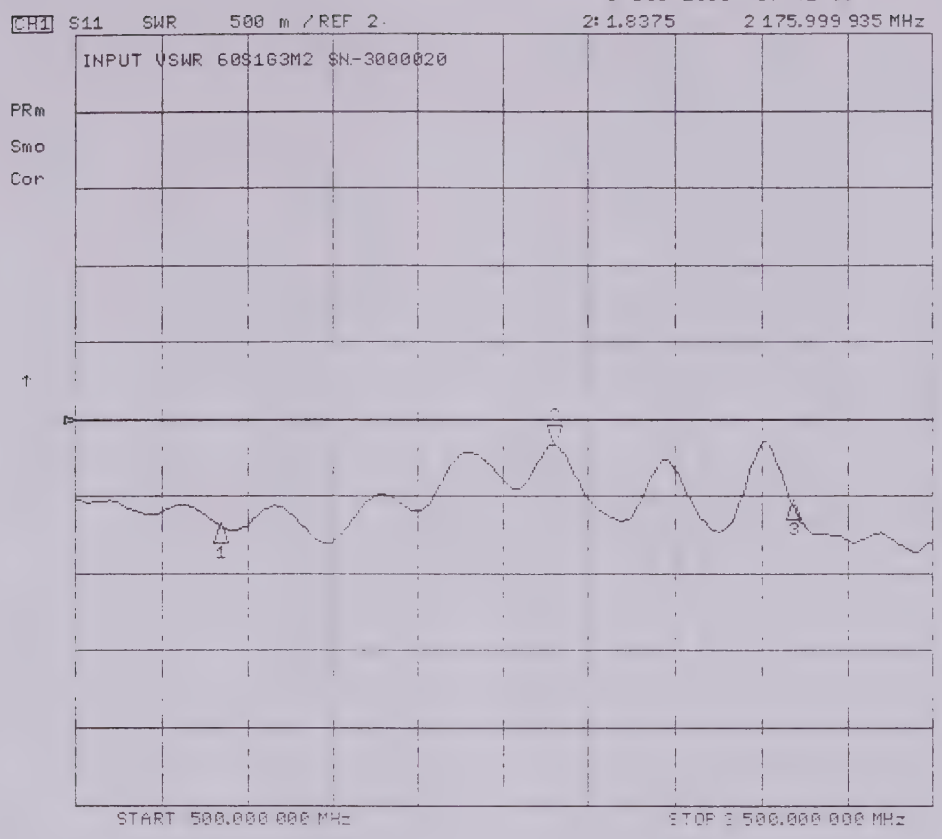

8 Dec 2000 07:41:30
CH2 S21 LOG 1 dB/ REF 53.35 dB 3: 53.656 dB 3 000.000 000 MHz
GAIN FLATNESS 60S163M2 SN-3000020
CH2 Markers
1: 53.130 dB
1.00000 GHz
PRm
Smo
CA
1
3
START 500.000 000 MHz
STOP 3 500.000 000 MHz

8 Dec 2000 07:38:38



CH1 Markers
1: 49.232 dB
1.00000 GHz

8 Dec 2000 07:42:55



CH1 Markers

1: 1.3143
1.00000 GHz

3: 1.4641
3.00000 GHz

P.J.G. DEC 0 8 2000

WARRANTIES: LIMITATION OF LIABILITY

Seller warrants (i) that seller has title to the goods sold and (ii) that Amplifiers, Antennas, Test Cells, Directional Couplers and Tripods will be free from defects in material and workmanship for a period of three (3) years from date of shipment shown on Amplifier Research invoice. Field Monitoring Equipment and Interference Generators will be free from defects in material and workmanship for a period of two (2) years from date of shipment. Vacuum tubes, traveling-wave tubes and other products will be free from defects in material and workmanship for a period of one (1) year. Seller's sole responsibility in fulfilling these warranties shall be to repair or replace any goods which do not conform to the foregoing warranties or, at seller's option, to give buyer credit for defective goods. The warranty is valid only when used in the country specified at time of order. Warranty service must be obtained from the repair facility designated at that time. If warranty service is not available in the country where the equipment is to be used then it must be returned to Amplifier Research. Warranty service will be provided only for defective goods which are returned within the warranty period, freight costs prepaid to Amplifier Research or its designated repair facility.

There are no other warranties, express or implied, including any warranty of merchantability or fitness. Seller shall not be responsible for any incidental or consequential damages arising from any breach of warranty.

No person other than an officer of Amplifier Research Corporation, has any authority to bind seller to any affirmation, representation or warranty except as specifically included in the preceding terms and conditions.

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